

# **NEC Express5800/R120e-1E Configuration Guide**



## **Introduction**

This document contains product and configuration information that will enable you to configure your system. The guide will ensure fast and proper configuration of your NEC Express5800 server.

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# Technical Specification

## Key Features

- High performance with the latest Intel® Xeon® processor E5-2400 v2 product family
- Up to 384 GB of memory capacity, supporting high speed and energy efficient DDR3-1600 memory
- High energy efficiency with power capping feature and 80 PLUS® Titanium power supply
- Up to eight 2.5-inch drives in 1U dense form factor

## Specification

### 2.5-inch Drive Model (1 / 2)

Model		R120e-1E			
Processor	Type	Intel® Xeon® processor E5-2403 v2	Intel® Xeon® processor E5-2407 v2	Intel® Xeon® processor E5-2420 v2	Intel® Xeon® processor E5-2430 v2
	Clock speed	1.80 GHz	2.40 GHz	2.20 GHz	2.50 GHz
	Number of Processors	1 or 2			
	Cache	10 MB		15 MB	
	Cores and Threads	4C-4T		6C-12T	
Chipset		Intel® C602 Chipset			
Memory	Type	DDR3-1600 ECC Unbuffered Low Power DIMM, DDR3-1600 and DDR3-1333 ECC Registered Low Power DIMM			
	Standard Capacity	0 GB			
	Maximum Capacity	384 GB (12 x 32 GB)			
	Memory protection	ECC, x4 SDDC, Memory Mirroring, Memory Lockstep, Memory Sparing			
Internal Storage	Standard Capacity	0 GB			
	Maximum Capacity	SAS HDD: 9.6 TB (8 x 1.2 TB) SATA HDD: 8 TB (8 x 1 TB) SAS SSD: 3.2 TB (8 x 400 GB)			
	Storage Controller	SATA : 3Gb/s and 6Gb/s (Integrated) SAS: 6Gb/s (Optional)			
	RAID	SATA : RAID 0/1/10(Standard), RAID 5/6/50/60 (Optional) SAS : RAID 0/1/5/6/10/50/60 (Optional)			
	Hot Plug	Supported			
	Optical Disk Drive	Optional			
	Optical Drive Bays	1			
	Disk Drive Bays	8 with optional drive cage			
	Expansion Slots	Standard	Total: 3 slots available 1 x PCIe 3.0 x16 (x16 connector) 1 x PCIe 2.0 x4 (x8 connector) 1 x PCIe 3.0 x8 (x8 connector) dedicated RAID slot		
Video	Controller (VRAM)	Integrated in Server Management Controller (32MB)			
	Resolution / Color	1280 x 1024 / 16.7M <sup>1</sup>			
Interfaces		9 x USB2.0 (2 x front, 4 x rear, 3 x internal) 2 x VGA (15-pin mini D-sub, 1 x front, 1 x rear) 1 to 2 x Serial (9-pin mini D-sub, RS232-C, 1 to 2 x rear) 4 x 1000BASE-T LAN connector (RJ-45, 4 x rear) 1 x Management LAN connector (RJ-45, 1 x rear)			
Server Management		EXPRESSSCOPE Engine 3			
Redundant Fan		Standard, non-hot plug			
Redundant Power Supply		Optional, hot plug			

Model		R120e-1E			
Power Supply		1 to 2 x 450 Watt or 800 Watt 80 PLUS® Platinum certified, or 800 Watt 80 PLUS® Titanium certified hot plug PSU 100-240 VAC ± 10% 50 / 60 Hz ± 3 Hz			
Power Consumption	Max. Config, Idling	180VA / 179 Watt	182 VA / 181 Watt	183 VA / 181 Watt	180 VA / 179 Watt
	Max. Config, Operating	361 VA / 358 Watt	367 VA / 365 Watt	435 VA / 432 Watt	462 VA / 458 Watt
Acoustical Noise (Sound Pressure Level) <sup>2</sup>	Max. Config, Idling	46.7 dB			
	Max. Config, Operating	57.1 dB			
Dimensions (W x D x H )		439.8 x 682.1 x 43.4 mm / 17.3 x 26.9 x 1.7 in (1U)			
Weight (Minimum / Maximum)		13 kg / 18.0 kg, 28.66 lbs. / 39.68 lbs.			
Temperature, Relative Humidity (non-condensing)		Operating: 10° to 40° C / 50° to 104° F, 20 to 80% Non-Operating: -10° to 55° C / 14° to 131° F, 20 to 80%			
Regulatory and Safety		FCC, CE, UL, CB, RCM, BSMI, KC, CCC, BIS, RoHS			
Operating Systems and Virtualization Software		Microsoft® Windows Server® 2008 Standard Microsoft® Windows Server® 2008 Enterprise Microsoft® Windows Server® 2008 Standard (x64) Microsoft® Windows Server® 2008 Enterprise (x64) Microsoft® Windows Server® 2008 R2 Standard Microsoft® Windows Server® 2008 R2 Enterprise Microsoft® Windows Server® 2012 Standard <sup>3</sup> Microsoft® Windows Server® 2012 Datacenter <sup>3</sup> Red Hat Enterprise Linux 5.9 or later (x86) <sup>4</sup> Red Hat Enterprise Linux 5.9 or later (EM64T) <sup>4</sup> Red Hat Enterprise Linux 6.4 or later (x86) <sup>4</sup> Red Hat Enterprise Linux 6.4 or later (x86_64) <sup>4</sup> VMware ESXi 5.0 Update 2 VMware ESXi 5.1 Update 1 VMware ESXi 5.5 <sup>5</sup> VMware ESXi 5.5 Update 1 <sup>5</sup>			

<sup>1</sup> Maximum resolution available via EXPRESSSCOPE Engine 3 remote console is 1280 x 1024 / 65K colors.

<sup>2</sup> Noise emission was measured at the bystander positions in accordance with ISO 7779. The actual value may vary by the operating environment.

<sup>3</sup> For Windows Server 2012 installation, download the driver kit from the following website and install it after OS installation  
<http://www.nec.com/en/global/prod/express/download/>

<sup>4</sup> For Linux support, contact your sales representative or go to the NEC website at:  
<http://www.nec.com/global/prod/express/linux/index.html>

<sup>5</sup> At least 5 GB of memory is required for VMware ESXi™ 5.5

## 2.5-inch Drive Model (2 / 2)

Model		R120e-1E		
Processor	Type	Intel® Xeon® processor E5-2430L v2	Intel® Xeon® processor E5-2440 v2	Intel® Xeon® processor E5-2470 v2
	Clock speed	2.40 GHz	1.90 GHz	2.40 GHz
	Number of Processors	1 or 2		
	Cache	15 MB	20 MB	25 MB
	Cores and Threads	6C-12T	8C-16T	10C-20T
Chipset		Intel® C602 Chipset		
Memory	Type	DDR3-1600 ECC Unbuffered Low Power DIMM, DDR3-1600 and DDR3-1333 ECC Registered Low Power DIMM		
	Standard Capacity	0 GB		
	Maximum Capacity	384 GB (12 x 32 GB)		

Model		R120e-1E		
Memory (Cont.)	Memory protection	ECC, x4 SDDC, Memory Mirroring, Memory Lockstep, Memory Sparing		
Internal Storage	Standard Capacity	0 GB		
	Maximum Capacity	SAS HDD: 9.6 TB (8 x 1.2 TB) SATA HDD: 8 TB (8 x 1 TB) SAS SSD: 3.2 TB (8 x 400 GB)		
	Storage Controller	SATA : 3Gb/s and 6Gb/s (Integrated) SAS: 6Gb/s (Optional)		
	RAID	SATA : RAID 0/1/10(Standard), RAID 5/6/50/60 (Optional) SAS : RAID 0/1/5/6/10/50/60 (Optional)		
	Hot Plug	Supported		
	Optical Disk Drive	Optional		
	Optical Drive Bays	1		
	Disk Drive Bays	8 with optional drive cage		
Expansion Slots	Standard	Total: 3 slots available 1 x PCIe 3.0 x16 (x16 connector) 1 x PCIe 2.0 x4 (x8 connector) 1 x PCIe 3.0 x8 (x8 connector) dedicated RAID slot		
Video	Controller (VRAM)	Integrated in Server Management Controller (32MB)		
	Resolution / Color	1280 x 1024 / 16.7M <sup>1</sup>		
Interfaces		9 x USB2.0 (2 x front, 4 x rear, 3 x internal) 2 x VGA (15-pin mini D-sub, 1 x front, 1 x rear) 1 to 2 x Serial (9-pin mini D-sub, RS232-C, 1 to 2 x rear) 4 x 1000BASE-T LAN connector (RJ-45, 4 x rear) 1 x Management LAN connector (RJ-45, 1 x rear)		
Server Management		EXPRESSSCOPE Engine 3		
Redundant Fan		Standard, non-hot plug		
Redundant Power Supply		Optional, hot plug		
Power Supply		1 to 2 x 450 Watt or 800 Watt 80 PLUS® Platinum certified, or 800 Watt 80 PLUS® Titanium certified hot plug PSU 100-240 VAC ± 10% 50 / 60 Hz ± 3 Hz		
Power Consumption	Max. Config, Idling	181 VA / 180 Watt	192 VA / 190 Watt	184 VA / 182 Watt
	Max. Config, Operating	418 VA / 415 Watt	487 VA / 484 Watt	535 VA / 531 Watt
Acoustic Noise (Sound Pressure Level) <sup>2</sup>	Max. Config, Idling	46.7 dB		
	Max. Config, Operating	57.1 dB		
Dimensions (W x D x H)		439.8 x 682.1 x 43.4 mm / 17.3 x 26.9 x 1.7 in (1U)		
Weight (Minimum / Maximum)		13 kg / 18.0 kg, 28.66 lbs. / 39.68 lbs.		
Temperature, Relative Humidity (non-condensing)		Operating: 10° to 40° C / 50° to 104° F, 20 to 80% Non-Operating: -10° to 55° C / 14° to 131° F, 20 to 80%		
Regulatory and Safety		FCC, CE, UL, CB, RCM, BSMI, KC, CCC, BIS, RoHS		
Operating Systems and Virtualization Software		Microsoft® Windows Server® 2008 Standard Microsoft® Windows Server® 2008 Enterprise Microsoft® Windows Server® 2008 Standard (x64) Microsoft® Windows Server® 2008 Enterprise (x64) Microsoft® Windows Server® 2008 R2 Standard Microsoft® Windows Server® 2008 R2 Enterprise Microsoft® Windows Server® 2012 Standard <sup>3</sup> Microsoft® Windows Server® 2012 Datacenter <sup>3</sup> Red Hat Enterprise Linux 5.9 or later (x86) <sup>4</sup> Red Hat Enterprise Linux 5.9 or later (EM64T) <sup>4</sup> Red Hat Enterprise Linux 6.4 or later (x86) <sup>4</sup> Red Hat Enterprise Linux 6.4 or later (x86_64) <sup>4</sup> VMware ESXi 5.0 Update 2 VMware ESXi 5.1 Update 1		

Model	R120e-1E
<b>Operating Systems and Virtualization Software (Cont.)</b>	VMware ESXi 5.5 <sup>5</sup> VMware ESXi 5.5 Update 1 <sup>5</sup>
<sup>1</sup>	Maximum resolution available via EXPRESSSCOPE Engine 3 remote console is 1280 x 1024 / 65K colors.
<sup>2</sup>	Noise emission was measured at the bystander positions in accordance with ISO 7779. The actual value may vary by the operating environment.
<sup>3</sup>	For Windows Server 2012 installation, download the driver kit from the following website and install it after OS installation <a href="http://www.nec.com/en/global/prod/express/download/">http://www.nec.com/en/global/prod/express/download/</a>
<sup>4</sup>	For Linux support, contact your sales representative or go to the NEC website at: <a href="http://www.nec.com/global/prod/express/linux/index.html">http://www.nec.com/global/prod/express/linux/index.html</a>
<sup>5</sup>	At least 5 GB of memory is required for VMware ESXi™ 5.5

### 3.5-inch Drive Model (1 / 2)

Model	R120e-1E
<b>Processor</b>	<b>Type</b>
	Intel® Xeon® processor E5-2403 v2
	Intel® Xeon® processor E5-2407 v2
	Intel® Xeon® processor E5-2430 v2
	<b>Clock speed</b>
	1.80 GHz
	2.40 GHz
	2.50 GHz
	<b>Number of Processors</b>
	1 or 2
	<b>Cache</b>
	10 MB
	15 MB
	<b>Cores and Threads</b>
	4C-4T
	6C-12T
<b>Chipset</b>	Intel® C602 Chipset
<b>Memory</b>	<b>Type</b>
	DDR3-1600 ECC Unbuffered Low Power DIMM, DDR3-1600 and DDR3-1333 ECC Registered Low Power DIMM
	<b>Standard Capacity</b>
	0 GB
	<b>Maximum Capacity</b>
	384 GB (12 x 32 GB)
	<b>Memory protection</b>
	ECC, x4 SDDC, Memory Mirroring, Memory Lockstep, Memory Sparing
<b>Internal Storage</b>	<b>Standard Capacity</b>
	0 GB
	<b>Maximum Capacity</b>
	16 TB (4 x 4 TB)
	<b>Storage Controller</b>
	3Gb/s and 6Gb/s (Integrated)
	<b>RAID</b>
	RAID 0/1/10(Standard), RAID 5/6/50/60 (Optional)
	<b>Hot Plug</b>
	Supported
	<b>Optical Disk Drive</b>
	Optional
	<b>Optical Drive Bays</b>
	1
	<b>Disk Drive Bays [free]</b>
	4
<b>Expansion Slots</b>	<b>Standard</b>
	Total: 3 slots available
	1 x PCIe 3.0 x16 (x16 connector)
	1 x PCIe 2.0 x4 (x8 connector)
	1 x PCIe 3.0 x8 (x8 connector) dedicated RAID slot
<b>Video</b>	<b>Controller (VRAM)</b>
	Integrated in Server Management Controller (32MB)
	<b>Resolution / Color</b>
	1280 x 1024 / 16.7M <sup>1</sup>
<b>Interfaces</b>	9 x USB2.0 (2 x front, 4 x rear, 3 x internal)
	2 x VGA (15-pin mini D-sub, 1 x front, 1 x rear)
	1 to 2 x Serial (9-pin mini D-sub, RS232-C, 1 to 2 x rear)
	4 x 1000BASE-T LAN connector (RJ-45, 4 x rear)
	1 x Management LAN connector (RJ-45, 1 x rear)
<b>Server Management</b>	EXPRESSSCOPE Engine 3
<b>Redundant Fan</b>	Standard, non-hot plug
<b>Redundant Power Supply</b>	Optional, hot plug
<b>Power Supply</b>	1 to 2 x 450 Watt 80 PLUS® Platinum certified hot plug PSU
	100-240 VAC ± 10% 50 / 60 Hz ± 3 Hz

Model		R120e-1E		
Power Consumption	Max. Config, Idling	154 VA / 153 Watt	156 VA / 155 Watt	152 VA / 151 Watt
	Max. Config, Operating	314 VA / 312 Watt	321 VA / 319 Watt	415 VA / 412 Watt
Acoustic Noise (Sound Pressure Level) <sup>2</sup>	Max. Config, Idling	43.5 dB		
	Max. Config, Operating	57.1 dB		
Dimensions (W x D x H)		439.8 x 682.1 x 43.4 mm / 17.3 x 26.9 x 1.7 in (1U)		
Weight (Minimum / Maximum)		13 kg / 18.0 kg, 28.66 lbs. / 39.68 lbs.		
Temperature, Relative Humidity (non-condensing)		Operating: 10° to 40° C / 50° to 104° F, 20 to 80% Non-Operating: -10° to 55° C / 14° to 131° F, 20 to 80%		
Regulatory and Safety		FCC, CE, UL, CB, RCM, BSMI, KC, CCC, BIS, RoHS		
Operating Systems and Virtualization Software		Microsoft® Windows Server® 2008 Standard Microsoft® Windows Server® 2008 Enterprise Microsoft® Windows Server® 2008 Standard (x64) Microsoft® Windows Server® 2008 Enterprise (x64) Microsoft® Windows Server® 2008 R2 Standard Microsoft® Windows Server® 2008 R2 Enterprise Microsoft® Windows Server® 2012 Standard <sup>3</sup> Microsoft® Windows Server® 2012 Datacenter <sup>3</sup> Red Hat Enterprise Linux 5.9 or later (x86) <sup>4</sup> Red Hat Enterprise Linux 5.9 or later (EM64T) <sup>4</sup> Red Hat Enterprise Linux 6.4 or later (x86) <sup>4</sup> Red Hat Enterprise Linux 6.4 or later (x86_64) <sup>4</sup> VMware ESXi 5.0 Update 2 VMware ESXi 5.1 Update 1 VMware ESXi 5.5 <sup>5</sup> VMware ESXi 5.5 Update 1 <sup>5</sup>		

<sup>1</sup> Maximum resolution available via EXPRESSSCOPE Engine 3 remote console is 1280 x 1024 / 65K colors.

<sup>2</sup> Noise emission was measured at the bystander positions in accordance with ISO 7779. The actual value may vary by the operating environment.

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<sup>4</sup> For Linux support, contact your sales representative or go to the NEC website at:  
<http://www.nec.com/global/prod/express/linux/index.html>

<sup>5</sup> At least 5 GB of memory is required for VMware ESXi™ 5.5

### 3.5-inch Drive Model (2 / 2)

Model		R120e-1E	
Processor	Type	Intel® Xeon® processor E5-2430L v2	Intel® Xeon® processor E5-2440 v2
	Clock speed	2.40 GHz	1.90 GHz
	Number of Processors	1 or 2	
	Cache	15 MB	20 MB
	Cores and Threads	6C-12T	8C-16T
Chipset		Intel® C602 Chipset	
Memory	Type	DDR3-1600 ECC Unbuffered Low Power DIMM, DDR3-1600 and DDR3-1333 ECC Registered Low Power DIMM	
	Standard Capacity	0 GB	
	Maximum Capacity	384 GB (12 x 32 GB)	
	Memory protection	ECC, x4 SDDC, Memory Mirroring, Memory Lockstep, Memory Sparing	



Model		R120e-1E
Internal Storage	Standard Capacity	0 GB
	Maximum Capacity	16 TB (4 x 4 TB)
	Storage Controller	3Gb/s and 6Gb/s (Integrated)
	RAID	RAID 0/1/10(Standard), RAID 5/6/50/60 (Optional)
	Hot Plug	Supported
	Optical Disk Drive	Optional
	Optical Drive Bays	1
	Disk Drive Bays	4
Expansion Slots	Standard	Total: 3 slots available 1 x PCIe 3.0 x16 (x16 connector) 1 x PCIe 2.0 x4 (x8 connector) 1 x PCIe 3.0 x8 (x8 connector) dedicated RAID slot
Video	Controller (VRAM)	Integrated in Server Management Controller (32MB)
	Resolution / Color	1280 x 1024 / 16.7M <sup>1</sup>
Interfaces		9 x USB2.0 (2 x front, 4 x rear, 3 x internal) 2 x VGA (15-pin mini D-sub, 1 x front, 1 x rear) 1 to 2 x Serial (9-pin mini D-sub, RS232-C, 1 to 2 x rear) 4 x 1000BASE-T LAN connector (RJ-45, 4 x rear) 1 x Management LAN connector (RJ-45, 1 x rear)
Server Management		EXPRESSSCOPE Engine 3
Redundant Fan		Standard, non-hot plug
Redundant Power Supply		Optional, hot plug
Power Supply		1-2 x 450 Watt 80 PLUS® Platinum certified hot plug PSU 100-240 VAC ± 10% 50 / 60 Hz ± 3 Hz
Power Consumption	Max. Config, Idling	155 VA / 154 Watt
	Max. Config, Operating	387 VA / 384 Watt
Acoustic Noise (Sound Pressure Level) <sup>2</sup>	Max. Config, Idling	46.7 dB
	Max. Config, Operating	57.1dB
Dimensions (W x D x H)		439.8 x 682.1 x 43.4 mm / 17.3 x 26.9 x 1.7 in (1U)
Weight (Minimum / Maximum)		13 kg / 18.0 kg, 28.66 lbs. / 39.68 lbs.
Temperature, Relative Humidity (non-condensing)		Operating: 10° to 40° C / 50° to 104° F, 20 to 80% Non-Operating: -10° to 55° C / 14° to 131° F, 20 to 80%
Regulatory and Safety		FCC, CE, UL, CB, RCM, BSMI, KC, CCC, BIS, RoHS
Operating Systems and Virtualization Software		Microsoft® Windows Server® 2008 Standard Microsoft® Windows Server® 2008 Enterprise Microsoft® Windows Server® 2008 Standard (x64) Microsoft® Windows Server® 2008 Enterprise (x64)
Operating Systems and Virtualization Software (Cont.)		Microsoft® Windows Server® 2008 R2 Standard Microsoft® Windows Server® 2008 R2 Enterprise Microsoft® Windows Server® 2012 Standard <sup>3</sup> Microsoft® Windows Server® 2012 Datacenter <sup>3</sup> Red Hat Enterprise Linux 5.9 or later (x86) <sup>4</sup> Red Hat Enterprise Linux 5.9 or later (EM64T) <sup>4</sup> Red Hat Enterprise Linux 6.4 or later (x86) <sup>4</sup> Red Hat Enterprise Linux 6.4 or later (x86_64) <sup>4</sup> VMware ESXi 5.0 Update 2 VMware ESXi 5.1 Update 1 VMware ESXi 5.5 <sup>5</sup> VMware ESXi 5.5 Update 1 <sup>5</sup>

<sup>1</sup> Maximum resolution available via EXPRESSSCOPE Engine 3 remote console is 1280 x 1024 / 65K colors.

<sup>2</sup> Noise emission was measured at the bystander positions in accordance with ISO 7779. The actual value may vary by the operating environment.

<sup>3</sup> For Windows Server 2012 installation, download the driver kit from the following website and install it after OS installation



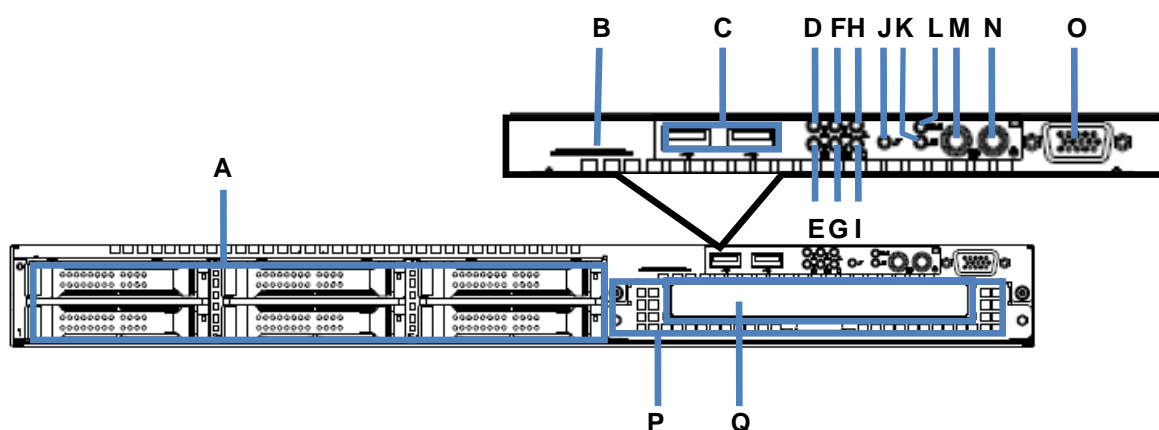
## CONFIGURATION GUIDE – NEC Express5800/R120e-1E

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- <sup>4</sup> For Linux support, contact your sales representative or go to the NEC website at:  
<http://www.nec.com/global/prod/express/linux/index.html>
- <sup>5</sup> At least 5 GB of memory is required for VMware ESXi™ 5.5

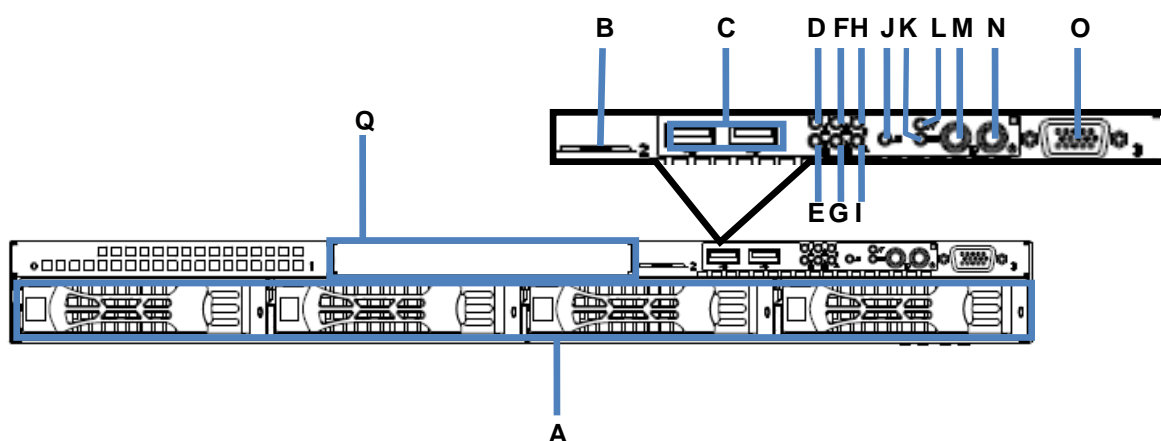
## External Views

### Front and Rear Views

#### Front View for 2.5-inch Drive Model



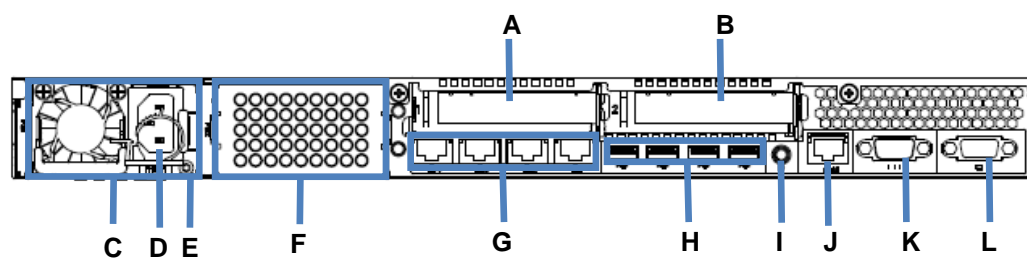
#### Front View for 3.5-inch Drive Model



#### Legend

A.	Drive Bays	J.	BMC RESET Switch
B.	Pull-out tab	K.	DUMP Switch
C.	USB Connectors	L.	RESET Switch
D.	Data LAN 1 Activity LED	M.	UID LED Button/LED
E.	Data LAN 2 Activity LED	N.	POWER Button/LED
F.	Data LAN 3 Activity LED	O.	VGA Connector
G.	Data LAN 4 Activity LED	P.	Optional 2.5-inch Drive Bay
H.	Hard Drive Activity LED	Q.	Optical Drive Bay
I.	System Status LED		

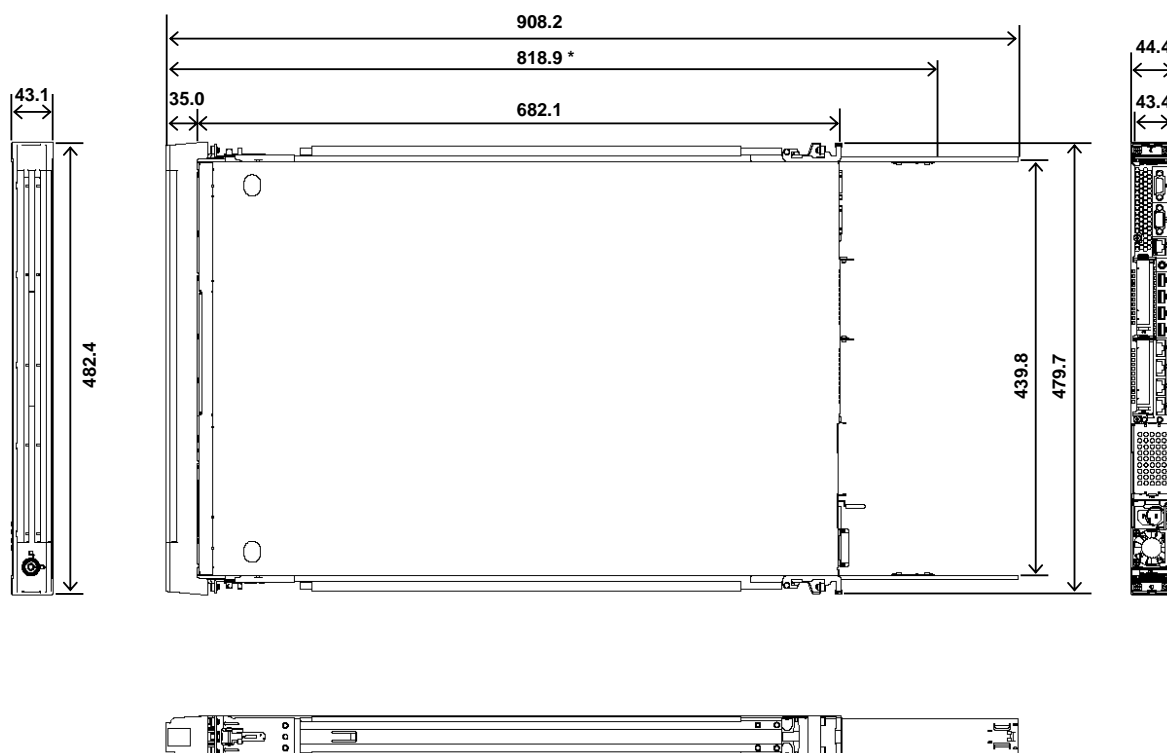
## Rear View



### Legend

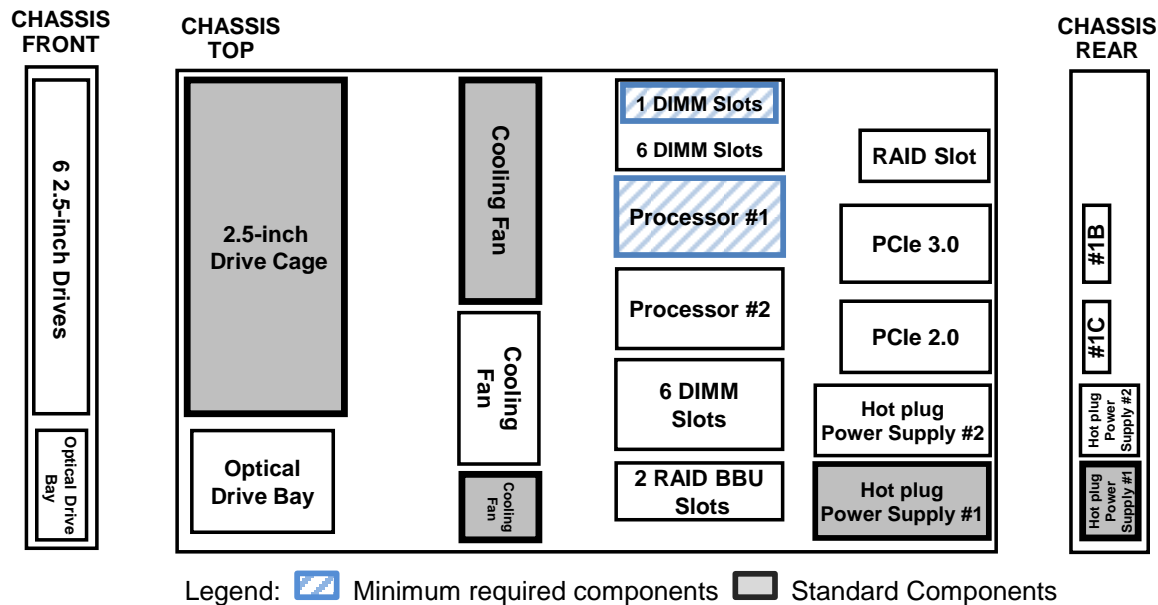
A.	PCI Slot (Low Profile)	G.	LAN Connector
B.	PCI Slot (Low Profile)	H.	USB Connector
C.	Power Supply	I.	UID LED Button/LED
D.	AC Inlet	J.	Management LAN Connector
E.	AC Power LED	K.	Serial Port Connector
F.	Additional PS Slot	L.	VGA Connector

## Dimensions (mm)

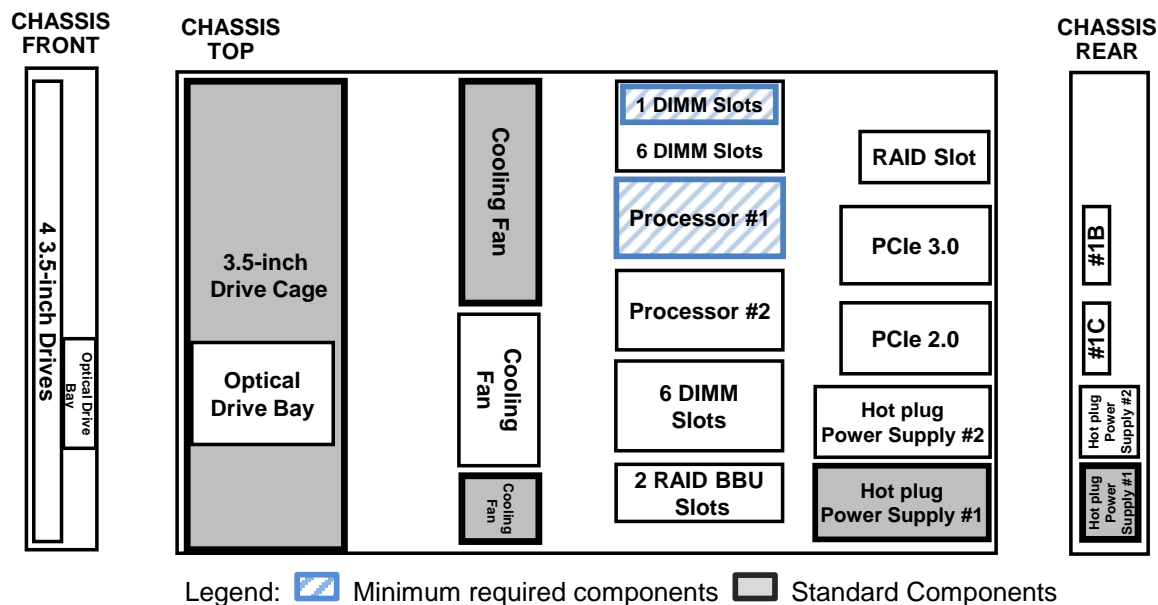


# Configuration Diagram

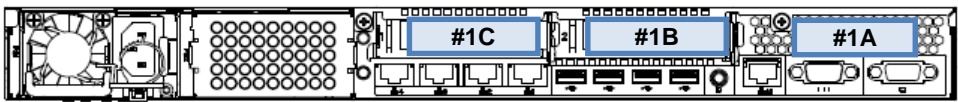
## 2.5-inch Drive Model



## 3.5-inch Drive Model



# Expansion Slot



Legend	
#1A	PCIe 3.0 x8, x8 connector, for a dedicated RAID controller
#1B	PCIe 3.0 x16, x16 connector, Low-profile, up to 170 mm length
#1C	PCIe 2.0 x4, x8 connector, Low-profile, up to 170 mm length

# Server Configuration

## 1 Base Models

### 2.5-inch Drive Model

Product Name / Description	Part Number
<b>NEC Express5800/R120e-1E Server</b> no processor, no RAM, no HDD, no ODD Including: 6 x 2.5-inch hot plug drive cage, 1 x 450 Watt 80 PLUS® Platinum hot plug power supply, EXPRESSBUILDER DVD	N8100-2142F
<b>NEC Express5800/R120e-1E Server</b> no processor, no RAM, no HDD, no ODD Including: 6 x 2.5-inch hot plug drive cage, 1 x 800 Watt 80 PLUS® Platinum hot plug power supply, EXPRESSBUILDER DVD	N8100-2143F
<b>NEC Express5800/R120e-1E Server</b> no processor, no RAM, no HDD, no ODD Including: 6 x 2.5-inch hot plug drive cage, 1 x 800 Watt 80 PLUS® Titanium hot plug power supply, EXPRESSBUILDER DVD	N8100-2144F

#### NOTE:

- The base model must be ordered with a processor kit.

### 3.5-inch Drive Model

Product Name / Description	Part Number
<b>NEC Express5800/R120e-1E Server</b> no processor, no RAM, no HDD, no ODD Including: 4 x 3.5-inch hot plug drive cage, 1 x 450 Watt 80 PLUS® Platinum hot plug power supply, EXPRESSBUILDER DVD	N8100-2145F

#### NOTE:

- The base model must be ordered with a processor kit.

## 2 Processors and Heat Sink

Available sockets: 2

Category		Product Name / Description	Part Number
CPU 1 Processor Required		<b>Xeon E5-2403 v2 Processor Kit</b> Intel® Xeon ® Processor E5-2403 v2 (1.80 GHz, 4C/4T, 10 MB)	N8101-730F
		<b>Xeon E5-2407 v2 Processor Kit</b> Intel® Xeon ® Processor E5-2407 v2 (2.40 GHz, 4C/4T, 10 MB)	N8101-731F
		<b>Xeon E5-2420 v2 Processor Kit</b> Intel® Xeon ® Processor E5-2420 v2 (2.20 GHz, 6C/12T, 15 MB) <b>NOTE:</b> The kit is supported on 2.5-inch drive model only.	N8101-732F
		<b>Xeon E5-2430 v2 Processor Kit</b> Intel® Xeon ® Processor E5-2430 v2 (2.50 GHz, 6C/12T, 15 MB)	N8101-733F
		<b>Xeon E5-2430L v2 Processor Kit</b> Intel® Xeon ® Processor E5-2430L v2 (2.40 GHz, 6C/12T, 15 MB)	N8101-734F
		<b>Xeon E5-2440 v2 Processor Kit</b> Intel® Xeon ® Processor E5-2440 v2 (1.90 GHz, 8C/16T, 20 MB)	N8101-735F
		<b>Xeon E5-2470 v2 Processor Kit</b> Intel® Xeon ® Processor E5-2470 v2 (2.40 GHz, 10C/20T, 25 MB) <b>NOTE:</b> The kit is supported on 2.5-inch drive model only.	N8101-736F
Heat Sink	1st	<b>Processor Heat Sink</b> For 1 <sup>st</sup> Processor	(Standard)
	2nd	<b>Processor Heat Sink</b> For 2 <sup>nd</sup> Processor, including cooling fan kit	N8101-576F

**NOTE:**

- Minimum one processor kit from above must be installed.
- The processors must be identical to configure dual processor system.
- Do not disable Hyper-Threading technology when using processors with a small number of cores and the system requires a lot of IO resources, in order to avoid performance down.

## The maximum number of logical processors supported by OS

See the table below for the maximum number of logical processors that you can actually use on your system.

Number of Logical Processors Supported by Operating Systems		Maximum Number of Logical Processors
Microsoft Windows Server 2008 Standard	32 <sup>1</sup>	32
Microsoft Windows Server 2008 Enterprise		
Microsoft Windows Server 2008 Standard (x64)	64 <sup>1</sup>	40
Microsoft Windows Server 2008 Enterprise (x64)		
Microsoft Windows Server 2008 R2 Standard (x64)	256 <sup>1</sup>	40
Microsoft Windows Server 2008 R2 Enterprise (x64)		
Microsoft Windows Server 2012 Standard	640 <sup>1</sup>	40
Microsoft Windows Server 2012 Datacenter		
Microsoft Windows Server 2012 R2 Standard		
Microsoft Windows Server 2012 R2 Datacenter		
Red Hat Enterprise Linux 5	32	32
Red Hat Enterprise Linux 6		
Red Hat Enterprise Linux 5 (EM64T)	160	40
Red Hat Enterprise Linux 6 (x86_64)		
VMware ESXi 5.0 / 5.1	160	40
VMware ESXi 5.5	320	40

<sup>1</sup> The maximum numbers of logical processors when using Hyper-V are below

- Windows Server 2008 : 24 logical processors
- Windows Server 2008 R2 : 64 logical processors
- Windows Server 2012 : 320 logical processors
- Windows Server 2012 R2 : 320 logical processors



## 3 Memory

### 3.1 Memory Configuration

Refer to the section in accordance with your memory configuration:

- Independent Channel Configuration: Refer to [3.1.1](#)
- Memory Sparing Configuration: Refer to [3.1.2](#)
- Memory Mirroring / Memory Lockstep Configuration: Refer to [3.1.3](#)

#### Memory Configuration Feature Comparison

See the table below for feature comparisons of memory configurations supported.

	Independent Channel	Memory Sparing	Memory Lockstep	Memory Mirroring
<b>Performance</b>	Best	Better	Better	Good
<b>Data Protection</b>	No (Correction only)	Persistent correctable errors that may result in future uncorrectable memory errors	No (Correction only)	Uncorrectable memory errors
<b>Redundancy</b>	No	Partly	No	Fully
<b>Data Correction</b>	ECC, x4 SDDC <sup>1</sup>	ECC, x4 SDDC	ECC, x8 SDDC	ECC, x4 SDDC
<b>Available Memory</b>	Full physical memory	3/4 physical memory	Full physical memory	Half physical memory
<b>Available Memory Channels</b>	3	3	2	2
<b>Notes</b>	-	All DIMMs in the system must be identical.	Paired DIMMs must be identical.	Paired DIMMs must be identical.

#### 3.1.1 Independent Channel Configuration

Available slots: 6 per processor

Category	Product Name / Description	Part Number
Unbuffered DIMM (UDIMM)	<b>4GB DDR3-1600 UNB Memory Kit</b> 1 x 4GB Unbuffered ECC DIMM, DDR3L-1600(PC3L-12800) <b>NOTE: The x4 SDDC is not supported.</b>	N8102-570F
Registered DIMM (RDIMM)	<b>4GB DDR3-1600 REG Memory Kit</b> 1 x 4GB Registered ECC DIMM, DDR3L-1600(PC3L-12800) <b>NOTE: The x4 SDDC is not supported.</b>	N8102-572F
	<b>8GB DDR3-1600 REG Memory Kit</b> 1 x 8GB Registered ECC DIMM, DDR3L-1600(PC3L-12800)	N8102-573F
	<b>16GB DDR3-1600 REG Memory Kit</b> 1 x 16GB Registered ECC DIMM, DDR3L-1600(PC3L-12800)	N8102-574F
	<b>32GB DDR3-1333 REG Memory Kit</b> 1 x 32GB Registered ECC DIMM, DDR3L-1333(PC3L-10600)	N8102-575F

#### NOTE:

- Minimum one memory kit per processor must be installed.
- It is recommended to install three identical memory kits for triple-channel symmetric memory configurations to increase memory transfer speed.
- When two processors are installed, balance the DIMMs across the two processors.
- Mix configurations of UDIMM/RDIMM are not supported.
- At least 5 GB of memory is required for VMware ESXi™ 5.5

### 3.1.2 Memory Sparing Configuration

Available slots: 6 per processor

Product Name / Description	Part Number
<b>32GB DDR3-1600 REG Memory Kit</b> 2 x 16GB Registered ECC DIMM, DDR3L-1600(PC3L-12800)	N8102-581

**NOTE:**

- Minimum one memory kit per processor must be installed.
- The memory kits must be identical.
- The logical memory capacity becomes three-fourths of physical capacity.
- At least 5 GB of memory is required for VMware ESXi™ 5.5

### 3.1.3 Memory Mirroring / Memory Lockstep Configuration

Available slots: 4 per processor

Product Name / Description	Part Number
<b>8GB DDR3-1600 REG Memory Kit</b> 2 x 4GB Registered ECC DIMM, DDR3L-1600(PC3L-12800)	N8102-577
<b>16GB DDR3-1600 REG Memory Kit</b> 2 x 8GB Registered ECC DIMM, DDR3L-1600(PC3L-12800)	N8102-578
<b>32GB DDR3-1600 REG Memory Kit</b> 2 x 16GB Registered ECC DIMM, DDR3L-1600(PC3L-12800)	N8102-579

**NOTE:**

- Minimum one memory kit per processor must be installed.
- The logical memory capacity becomes a half of physical capacity.
- At least 5 GB of memory is required for VMware ESXi™ 5.5

### Maximum Memory Speed

See the table below for the actual maximum memory transfer speed in Independent Channel / Memory Sparing Configuration.

DDR3 memory speed depends on the type of DIMMs, the native memory bus speed of the memory controller and memory configuration. All memory buses operate at the clock frequency of the DIMM with the lowest frequency.

Processor Type	Populated DIMMs	# of DIMMs per processor	Memory Power Setting	DIMM Speed
E5-2403 v2 E5-2407 v2	UDIMM: 4GB	Up to 3 DIMMs	-	1333 MHz
		4 or more DIMMs	-	1066 MHz
	RDIMM: 4 GB, 8 GB, 16 GB	-	-	1333 MHz
	RDIMM: 32 GB	-	-	800 MHz
E5-2420 v2 E5-2430 v2 E5-2430L v2 E5-2440 v2 E5-2470 v2	UDIMM: 4GB	Up to 3 DIMMs	-	1333 MHz
		4 or more DIMMs	-	1066 MHz
	RDIMM: 2 GB, 4 GB, 8 GB, 16 GB	-	Low (1.35V)	1333 MHz
		-	Normal (1.5V)	1600 MHz
	RDIMM: 32 GB	-	-	800 MHz

## Maximum Available Memory

See the table below for the maximum memory size that you can actually use on your system.

The maximum available memory is less than the maximum physical memory supported by your system because some chipsets require PCI resource space of about 750MB. PCI resource requirements vary depending on the type and the number of PCI cards you are using.

Maximum Memory Size Supported by Operating Systems		Maximum Available Memory
Microsoft Windows Server 2008 Standard <sup>1</sup>	4 GB	4 GB (HW-DEP enabled) App. 2 GB(HW-DEP disabled)
Microsoft Windows Server 2008 Standard (x64) <sup>1</sup>	32 GB	32 GB
Microsoft Windows Server 2008 R2 Standard <sup>1</sup>		
Microsoft Windows Server 2008 Enterprise <sup>1</sup>	64 GB	64 GB
Microsoft Windows Server 2008 Enterprise (x64) <sup>1</sup>	1 TB	384 GB
Microsoft Windows Server 2008 R2 Enterprise <sup>1</sup>	2 TB	384 GB
Microsoft Windows Server 2012 Standard <sup>1</sup>	4 TB	384 GB
Microsoft Windows Server 2012 Datacenter <sup>1</sup>		
Microsoft Windows Server 2012 R2 Standard <sup>1</sup>		
Microsoft Windows Server 2012 R2 Datacenter <sup>1</sup>		
Red Hat Enterprise Linux 5	16 GB	16 GB
Red Hat Enterprise Linux 6		
Red Hat Enterprise Linux 5 (EM64T)	1 TB	384 GB
Red Hat Enterprise Linux 6 (x86_64)	3 TB	384 GB
VMware ESXi 5.0 / 5.1 <sup>2</sup>	2 TB	384 GB
VMware ESXi 5.5 <sup>2</sup>	4 TB	384 GB

<sup>1</sup> The maximum available memory size of Hyper-V systems are below:

- Windows Server 2008 Standard (x64) and Windows Server 2008 R2 Standard : 32 GB
- Windows Server 2008 Enterprise (x64) and Windows Server 2008 R2 Enterprise : 1TB
- Windows Server 2012, Windows Server 2012 R2 : 4 TB

<sup>2</sup> Up to 1 TB of the main memory is available to each virtual machine.

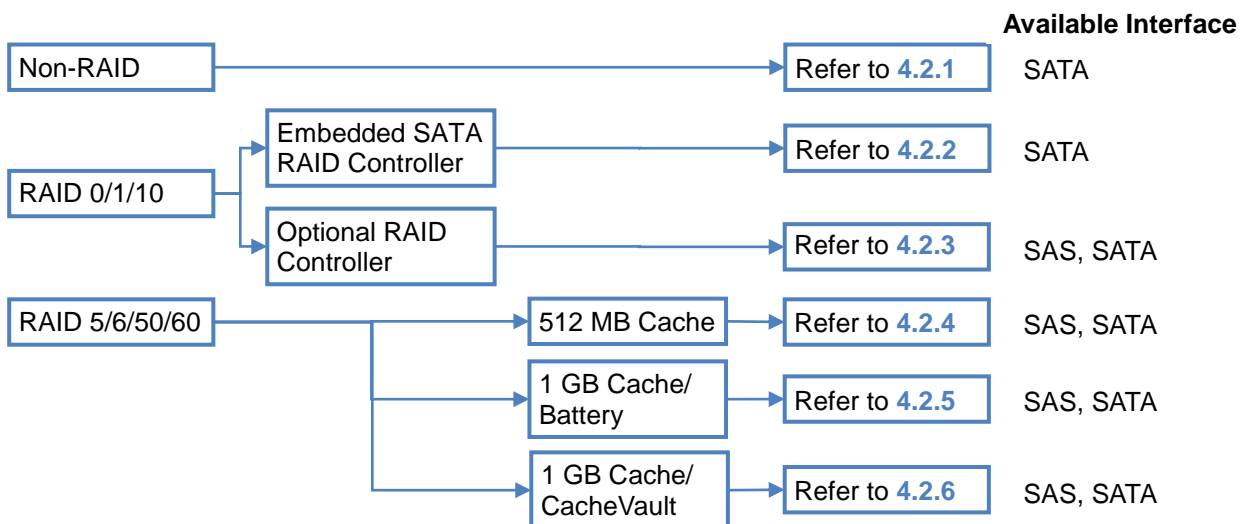
## 4 Internal Hard Disk Drives

### 4.1 RAID Configuration

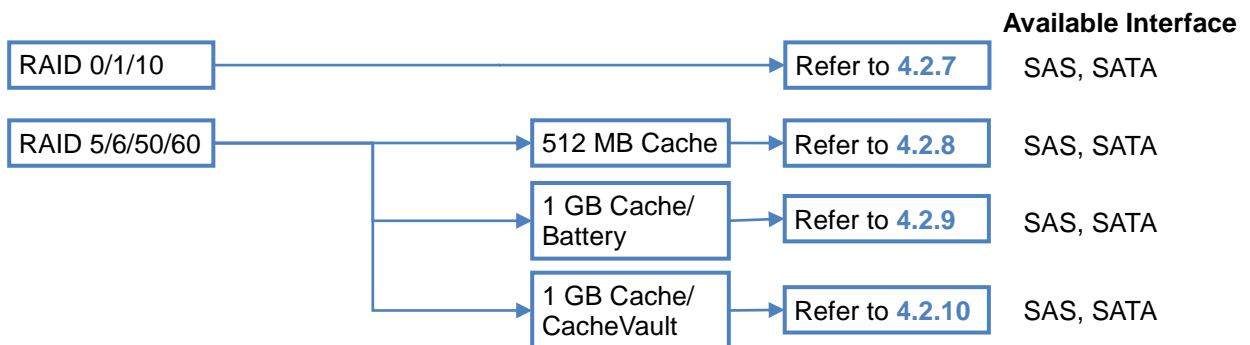
Refer to the section in accordance with your disk form factor and RAID configuration.

#### 4.1.1 2.5-inch Drive Model

##### Up to six 2.5-inch Drives



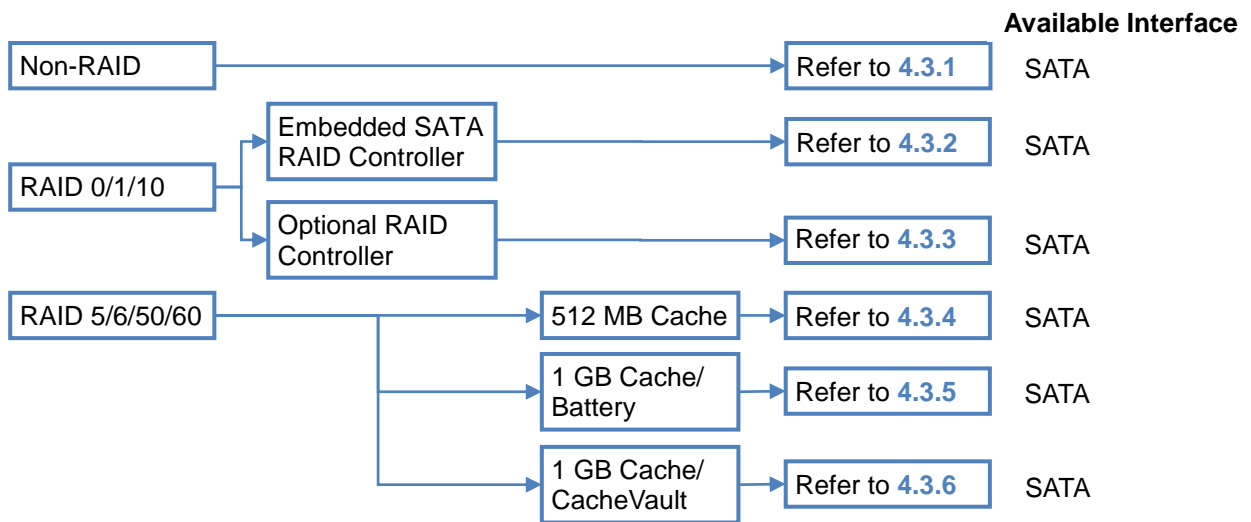
##### Up to eight 2.5-inch Drives



#### NOTE:

- Up to four hard drives can be installed in the Embedded SATA configuration.
- Embedded SATA RAID controller is supported only on Windows operating systems. An optional RAID controller is required to configure RAID array for other operating systems.
- Hot plug insertion/removal are not supported in the Embedded SATA non-RAID controller.
- All drives within a RAID array should be of the same type, capacity and rotation speed.
- Use the same rotational speed of the SAS hard drives.
- To configure a large-capacity RAID array, it is recommended to configure in RAID 6 or RAID 60 in order to minimize the risk of becoming multiple hard drives failure during the RAID rebuilding process.
- Up to two kinds of drives selected from SAS 10K HDDs, SAS 15K HDDs, SATA HDDs and SAS SSDs can be mixed in each drive cage.

### 4.1.2 3.5-inch Drive Model



**NOTE:**

- Embedded SATA RAID controller is supported only on Windows operating systems. An optional RAID controller is required to configure RAID array for other operating systems.
- Embedded SATA RAID Controller does not support RAID 10 configured with 2TB and 3TB HDDs.
- Hot plug insertion/removal is not supported with the Embedded SATA non-RAID controller.
- All hard drives within a RAID array should be of the same capacity.
- For optional RAID controller driver to install Windows Server 2003 R2, download from the NEC website at:  
<http://www.nec.com/en/global/prod/express/download/index.html>

## 4.2 Hot Plug 2.5-inch Drive Configuration

### 4.2.1 Up to four Drives with Embedded SATA non-RAID Controller

Category		Product Name / Description	Part Number
Storage Controller		<b>Embedded SATA Controller</b> 2 x 6Gb/s SATA, 2 x 3Gb/s SATA	(Standard)
Cable Required		<b>Internal SATA Cable</b> 4 x Single SATA to 1 x mini-SAS	(Standard)
Drive Cage Required		<b>2.5-inch Hot Plug Drive Cage Kit</b> 6 x 2.5-inch hot plug hard drive bays	(Standard)
Drive 4 slots available	SATA	<b>250GB 7.2K Hot Plug 2.5-inch SATA HDD</b> 1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		<b>500GB 7.2K Hot Plug 2.5-inch SATA HDD</b> 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		<b>1TB 7.2K Hot Plug 2.5-inch SATA HDD</b> 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358

**NOTE:**

- Hot plug insertion/removal is not supported with the Embedded SATA non-RAID controller.
- The maximum transfer speed for Slot 2 and Slot 3 is 3 Gb/s.

### 4.2.2 Up to four Drives with Embedded SATA RAID Controller

Category		Product Name / Description	Part Number
Storage Controller		<b>Embedded SATA Controller</b> 2 x 6Gb/s SATA, 2 x 3Gb/s SATA, RAID 0/1/10 capable	(Standard)
Cable		<b>Internal SATA Cable</b> 4 x Single SATA to 1 x mini-SAS	(Standard)
Drive Cage		<b>2.5-inch Hot Plug Drive Cage Kit</b> 6 x 2.5-inch hot plug hard drive bays	(Standard)
Drive 4 slots available	SATA HDD	<b>250GB 7.2K Hot Plug 2.5-inch SATA HDD</b> 1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		<b>500GB 7.2K Hot Plug 2.5-inch SATA HDD</b> 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		<b>1TB 7.2K Hot Plug 2.5-inch SATA HDD</b> 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358

**NOTE:**

- Embedded SATA RAID controller is supported only on Windows Server 2008 (32bit/64bit), Windows Server 2008 R2, Windows Server 2012 and Windows Server 2012 R2. An optional RAID controller is required to configure RAID array for other operating systems.
- The maximum transfer speed for Slot 2 and Slot 3 is 3 Gb/s.

### 4.2.3 Up to six Drives with RAID 0/1 Controller with 512 MB Cache

Category		Product Name / Description	Part Number
Storage Controller Required		<b>RAID Controller (512MB, RAID 0/1)</b> LSI MegaRAID SAS 9272-8i RAID 0/1/10, 512 MB, Int. 8, PCIe 3.0 x8, 6Gb/s	N8103-172
RAID BBU Recommended		RAID Battery Backup Unit for LSI MegaRAID SAS 9267-8i/9272-8i	N8103-153
Cable		<b>Internal SAS/SATA Cable</b> two set of 1 x mini-SAS to 4 x Single SATA	(Standard)
Drive Cage		<b>2.5-inch Hot Plug Drive Cage Kit</b> 6 x 2.5-inch hot plug hard drive bays	(Standard)
Drive 6 slots available	SAS HDD	<b>300GB 10K Hot Plug 2.5-inch SAS HDD</b> 1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301B
		<b>450GB 10K Hot Plug 2.5-inch SAS HDD</b> 1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322B
		<b>600GB 10K Hot Plug 2.5-inch SAS HDD</b> 1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304B
		<b>900GB 10K Hot Plug 2.5-inch SAS HDD</b> 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332B
		<b>1.2TB 10K Hot Plug 2.5-inch SAS HDD</b> 1 x 1.2TB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-408B
		<b>146.5GB 15K Hot Plug 2.5-inch SAS HDD</b> 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303B
		<b>300GB 15K Hot Plug 2.5-inch SAS HDD</b> 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331B
		<b>450GB 15K Hot Plug 2.5-inch SAS HDD</b> 1x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-442
		<b>600GB 15K Hot Plug 2.5-inch SAS HDD</b> 1x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-443
	SATA HDD	<b>250GB 7.2K Hot Plug 2.5-inch SATA HDD</b> 1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		<b>500GB 7.2K Hot Plug 2.5-inch SATA HDD</b> 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		<b>1TB 7.2K Hot Plug 2.5-inch SATA HDD</b> 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
	SAS SSD	<b>200GB Hot Plug 2.5-inch SAS SSD</b> 1 x 200 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-711
		<b>400GB Hot Plug 2.5-inch SAS SSD</b> 1 x 400 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-712

**NOTE:**

- All drives within a RAID array should be of the same type, capacity and rotation speed.
- Up to two different kinds of drives selected from SAS 10K HDDs, SAS 15K HDDs, SATA HDDs and SAS SSDs can be mixed in one system.



#### 4.2.4 Up to six Drives with RAID 5/6 Controller with 512 MB Cache

Category	Product Name / Description		Part Number
<b>Storage Controller Required</b>	<b>RAID Controller (512MB, RAID 0/1/5/6)</b> LSI MegaRAID SAS 9272-8i RAID0/1/5/6/10/50/60, 512 MB, Int. 8, PCIe 3.0 x8, 6Gb/s		N8103-173
<b>RAID BBU Recommended</b>	RAID Battery Backup Unit for LSI MegaRAID SAS 9267-8i/9272-8i		N8103-153
<b>Cable</b>	<b>Internal SAS/SATA Cable</b> two set of 1 x mini-SAS to 4 x Single SATA		(Standard)
<b>Drive Cage</b>	<b>2.5-inch Hot Plug Drive Cage Kit</b> 6 x 2.5-inch hot plug hard drive bays		(Standard)
<b>Drive 6 slots available</b>	<b>SAS HDD</b>	<b>300GB 10K Hot Plug 2.5-inch SAS HDD</b> 1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301B
		<b>450GB 10K Hot Plug 2.5-inch SAS HDD</b> 1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322B
		<b>600GB 10K Hot Plug 2.5-inch SAS HDD</b> 1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304B
		<b>900GB 10K Hot Plug 2.5-inch SAS HDD</b> 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332B
		<b>1.2TB 10K Hot Plug 2.5-inch SAS HDD</b> 1 x 1.2TB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-408B
		<b>146.5GB 15K Hot Plug 2.5-inch SAS HDD</b> 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303B
		<b>300GB 15K Hot Plug 2.5-inch SAS HDD</b> 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331B
		<b>450GB 15K Hot Plug 2.5-inch SAS HDD</b> 1x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-442
		<b>600GB 15K Hot Plug 2.5-inch SAS HDD</b> 1x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-443
	<b>SATA HDD</b>	<b>250GB 7.2K Hot Plug 2.5-inch SATA HDD</b> 1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		<b>500GB 7.2K Hot Plug 2.5-inch SATA HDD</b> 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		<b>1TB 7.2K Hot Plug 2.5-inch SATA HDD</b> 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
	<b>SAS SSD</b>	<b>200GB Hot Plug 2.5-inch SAS SSD</b> 1 x 200 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-711
		<b>400GB Hot Plug 2.5-inch SAS SSD</b> 1 x 400 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-712

#### NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed.
- Up to two different kinds of drives selected from SAS 10K HDDs, SAS 15K HDDs, SATA HDDs and SAS SSDs can be mixed in one system.
- To configure a large-capacity RAID array, it is recommended to configure in RAID 6 or RAID 60 in order to minimize the risk of becoming multiple hard drives failure during the RAID rebuilding process.

#### 4.2.5 Up to six Drives with RAID 5/6 Controller with 1 GB Cache/Battery

Category		Product Name / Description	Part Number
Storage Controller Required		<b>RAID Controller (1GB, RAID 0/1/5/6)</b> LSI MegaRAID SAS 9272-8i RAID 0/1/5/6/10/50/60, 1 GB, Int. 8, PCIe 3.0 x8, 6Gb/s	N8103-174
		<b>RAID BBU</b> RAID Battery Backup Unit for LSI MegaRAID SAS 9267-8i/9272-8i	N8103-153
SSD Caching Recommended		<b>MegaRAID CacheCade</b> for LSI MegaRAID SAS <b>NOTE:</b> - SSD used for cache is required - The SSD capacity which can be used as read cache is up to 512 GB.	N8103-156
Cable		<b>Internal SAS/SATA Cable</b> two set of 1 x mini-SAS to 4 x Single SATA	(Standard)
Drive Cage		<b>2.5-inch Hot Plug Drive Cage Kit</b> 6 x 2.5-inch hot plug hard drive bays	(Standard)
Drive 6 slots available	SAS HDD	<b>300GB 10K Hot Plug 2.5-inch SAS HDD</b> 1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301B
		<b>450GB 10K Hot Plug 2.5-inch SAS HDD</b> 1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322B
		<b>600GB 10K Hot Plug 2.5-inch SAS HDD</b> 1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304B
		<b>900GB 10K Hot Plug 2.5-inch SAS HDD</b> 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332B
		<b>1.2TB 10K Hot Plug 2.5-inch SAS HDD</b> 1 x 1.2TB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-408B
		<b>146.5GB 15K Hot Plug 2.5-inch SAS HDD</b> 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303B
		<b>300GB 15K Hot Plug 2.5-inch SAS HDD</b> 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331B
		<b>450GB 15K Hot Plug 2.5-inch SAS HDD</b> 1x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-442
		<b>600GB 15K Hot Plug 2.5-inch SAS HDD</b> 1x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-443
	SATA HDD	<b>250GB 7.2K Hot Plug 2.5-inch SATA HDD</b> 1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		<b>500GB 7.2K Hot Plug 2.5-inch SATA HDD</b> 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		<b>1TB 7.2K Hot Plug 2.5-inch SATA HDD</b> 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
	SAS SSD	<b>200GB Hot Plug 2.5-inch SAS SSD</b> 1 x 200 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-711
		<b>400GB Hot Plug 2.5-inch SAS SSD</b> 1 x 400 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-712

**NOTE:**

- All drives within a RAID array should be of the same type, capacity and rotation speed.
- Up to two different kinds of drives selected from SAS 10K HDDs, SAS 15K HDDs, SATA HDDs and SAS SSDs can be mixed in one system.
- To configure a large-capacity RAID array, it is recommended to configure in RAID 6 or RAID 60 in order to minimize the risk of becoming multiple hard drives failure during the RAID rebuilding process.

#### 4.2.6 Up to six Drives with RAID 5/6 Controller with 1 GB Cache/CacheVault

Category	Product Name / Description		Part Number
<b>Storage Controller Required</b>	<b>RAID Controller (1GB, RAID 0/1/5/6)</b> LSI MegaRAID SAS 9270CV-8i (with CV) RAID0/1/5/6/10/50/60, 1GB Cache, Int. 8ports, PCIe 3.0(x8), 6Gb/s, flash cache protection modules included		N8103-168
<b>SSD Caching Recommended</b>	<b>MegaRAID CacheCade</b> for LSI MegaRAID SAS 9267-8i / 9265CV-8i <b>NOTE:</b> - SSD used for cache is required - The SSD capacity which can be used as read cache is up to 512 GB.		N8103-156
<b>Cable</b>	<b>Internal SAS/SATA Cable</b> two set of 1 x mini-SAS to 4 x Single SATA		(Standard)
<b>Drive Cage</b>	<b>2.5-inch Hot Plug Drive Cage Kit</b> 6 x 2.5-inch hot plug hard drive bays		(Standard)
<b>Drive 6 slots available</b>	<b>SAS HDD</b>	<b>300GB 10K Hot Plug 2.5-inch SAS HDD</b> 1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301
		<b>450GB 10K Hot Plug 2.5-inch SAS HDD</b> 1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322
		<b>600GB 10K Hot Plug 2.5-inch SAS HDD</b> 1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304
		<b>900GB 10K Hot Plug 2.5-inch SAS HDD</b> 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332
		<b>1.2TB 10K Hot Plug 2.5-inch SAS HDD</b> 1x 1.2TB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-408
		<b>146.5GB 15K Hot Plug 2.5-inch SAS HDD</b> 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303
		<b>300GB 15K Hot Plug 2.5-inch SAS HDD</b> 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331
	<b>SATA HDD</b>	<b>250GB 7.2K Hot Plug 2.5-inch SATA HDD</b> 1x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		<b>500GB 7.2K Hot Plug 2.5-inch SATA HDD</b> 1x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		<b>1TB 7.2K Hot Plug 2.5-inch SATA HDD</b> 1x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
	<b>SAS SSD</b>	<b>200GB Hot Plug 2.5-inch SAS SSD</b> 1x 200 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-711
		<b>400GB Hot Plug 2.5-inch SAS SSD</b> 1x 400 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-712

**NOTE:**

- All drives within a RAID array should be of the same type, capacity and rotation speed.
- Up to two different kinds of drives selected from SAS 10K HDDs, SAS 15K HDDs, SATA HDDs and SAS SSDs can be mixed in one system.
- To configure a large-capacity RAID array, it is recommended to configure in RAID 6 or RAID 60 in order to minimize the risk of becoming multiple hard drives failure during the RAID rebuilding process.

#### 4.2.7 Up to eight Drives with RAID 0/1 Controller with 512 MB Cache

Category		Product Name / Description	Part Number
Storage Controller <b>Required</b>		<b>RAID Controller (512MB, RAID 0/1)</b>	N8103-172
		LSI MegaRAID SAS 9272-8i RAID 0/1/10, 512MB, Int. 8, PCIe 3.0 x8, 6Gb/s	
RAID BBU <b>Recommended</b>		<b>RAID Battery Backup Unit</b> for LSI MegaRAID SAS 9267-8i/9272-8i	N8103-153
Cable		<b>Internal SAS/SATA Cable</b> two set of 1 x mini-SAS to 4 x Single SATA	(Standard)
Drive Cage		<b>2.5-inch Hot Plug Drive Cage Kit</b> 6 x 2.5-inch hot plug hard drive bays	(Standard)
Optional Drive Cage <b>Required</b>		<b>2.5-inch Hot Plug Drive Cage Kit</b> 2 x 2.5-inch hot plug drive bays	N8154-45
Drive <b>8 slots available</b>	SAS HDD	<b>300GB 10K Hot Plug 2.5-inch SAS HDD</b> 1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301B
		<b>450GB 10K Hot Plug 2.5-inch SAS HDD</b> 1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322B
		<b>600GB 10K Hot Plug 2.5-inch SAS HDD</b> 1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304B
		<b>900GB 10K Hot Plug 2.5-inch SAS HDD</b> 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332B
		<b>1.2TB 10K Hot Plug 2.5-inch SAS HDD</b> 1 x 1.2TB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-408B
		<b>146.5GB 15K Hot Plug 2.5-inch SAS HDD</b> 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303B
		<b>300GB 15K Hot Plug 2.5-inch SAS HDD</b> 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331B
		<b>450GB 15K Hot Plug 2.5-inch SAS HDD</b> 1x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-442
		<b>600GB 15K Hot Plug 2.5-inch SAS HDD</b> 1x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-443
	SATA HDD	<b>250GB 7.2K Hot Plug 2.5-inch SATA HDD</b> 1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		<b>500GB 7.2K Hot Plug 2.5-inch SATA HDD</b> 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		<b>1TB 7.2K Hot Plug 2.5-inch SATA HDD</b> 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
	SAS SSD	<b>200GB Hot Plug 2.5-inch SAS SSD</b> 1 x 200 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-711
		<b>400GB Hot Plug 2.5-inch SAS SSD</b> 1 x 400 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-712

#### NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed.
- Up to two different kinds of drives selected from SAS 10K HDDs, SAS 15K HDDs, SATA HDDs and SAS SSDs can be mixed in one system.
- To configure a large-capacity RAID array, it is recommended to configure in RAID 6 or RAID 60 in order to minimize the risk of becoming multiple hard drives failure during the RAID rebuilding process.

#### 4.2.8 Up to eight Drives with RAID 5/6 Controller with 512 MB Cache

Category		Product Name / Description	Part Number
Storage Controller <b>Required</b>		<b>RAID Controller (512MB, RAID 0/1/5/6)</b> LSI MegaRAID SAS 9272-8i RAID0/1/5/6/10/50/60, 512MB, Int. 8, PCIe 3.0 x8, 6Gb/s	N8103-173
		<b>RAID BBU</b> for LSI MegaRAID SAS9267-8i/9272-8i	N8103-153
Cable		<b>Internal SAS/SATA Cable</b> two set of 1 x mini-SAS to 4 x Single SATA	(Standard)
Drive Cage		<b>2.5-inch Hot Plug Drive Cage Kit</b> 6 x 2.5-inch hot plug hard drive bays	(Standard)
Optional Drive Cage <b>Required</b>		<b>2.5-inch Hot Plug Drive Cage Kit</b> 2 x 2.5-inch hot plug drive bays	N8154-45
Drive <b>8 slots available</b>	SAS HDD	<b>300GB 10K Hot Plug 2.5-inch SAS HDD</b> 1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301B
		<b>450GB 10K Hot Plug 2.5-inch SAS HDD</b> 1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322B
		<b>600GB 10K Hot Plug 2.5-inch SAS HDD</b> 1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304B
		<b>900GB 10K Hot Plug 2.5-inch SAS HDD</b> 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332B
		<b>1.2TB 10K Hot Plug 2.5-inch SAS HDD</b> 1 x 1.2TB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-408B
		<b>146.5GB 15K Hot Plug 2.5-inch SAS HDD</b> 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303B
		<b>300GB 15K Hot Plug 2.5-inch SAS HDD</b> 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331B
		<b>450GB 15K Hot Plug 2.5-inch SAS HDD</b> 1x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-442
		<b>600GB 15K Hot Plug 2.5-inch SAS HDD</b> 1x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-443
	SATA HDD	<b>250GB 7.2K Hot Plug 2.5-inch SATA HDD</b> 1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		<b>500GB 7.2K Hot Plug 2.5-inch SATA HDD</b> 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		<b>1TB 7.2K Hot Plug 2.5-inch SATA HDD</b> 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
	SAS SSD	<b>200GB Hot Plug 2.5-inch SAS SSD</b> 1 x 200 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-711
		<b>400GB Hot Plug 2.5-inch SAS SSD</b> 1 x 400 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-712

#### NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed.
- Up to two different kinds of drives selected from SAS 10K HDDs, SAS 15K HDDs, SATA HDDs and SAS SSDs can be mixed in one system.
- To configure a large-capacity RAID array, it is recommended to configure in RAID 6 or RAID 60 in order to minimize the risk of becoming multiple hard drives failure during the RAID rebuilding process.

#### 4.2.9 Up to eight Drives with RAID 5/6 Controller with 1 GB Cache/Battery

Category		Product Name / Description	Part Number
Storage Controller Required		<b>RAID Controller (1GB, RAID 0/1/5/6)</b> LSI MegaRAID SAS 9272-8i RAID 0/1/5/6/10/50/60, 1 GB, Int. 8, PCIe 3.0 x8, 6Gb/s	N8103-174
		<b>RAID BBU</b> for LSI MegaRAID SAS 9267-8i/9272-8i	N8103-153
SSD Caching Recommended		<b>MegaRAID CacheCade</b> for LSI MegaRAID SAS <b>NOTE:</b> - SSD used for cache is required - The SSD capacity which can be used as read cache is up to 512 GB.	N8103-156
Cable		<b>Internal SAS/SATA Cable</b> two set of 1 x mini-SAS to 4 x Single SATA	(Standard)
Drive Cage		<b>2.5-inch Hot Plug Drive Cage Kit</b> 6 x 2.5-inch hot plug hard drive bays	(Standard)
Optional Drive Cage Required		<b>2.5-inch Hot Plug Drive Cage Kit</b> 2 x 2.5-inch hot plug drive bays	N8154-45
Drive 8 slots available	SAS HDD	<b>300GB 10K Hot Plug 2.5-inch SAS HDD</b> 1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301B
		<b>450GB 10K Hot Plug 2.5-inch SAS HDD</b> 1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322B
		<b>600GB 10K Hot Plug 2.5-inch SAS HDD</b> 1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304B
		<b>900GB 10K Hot Plug 2.5-inch SAS HDD</b> 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332B
		<b>1.2TB 10K Hot Plug 2.5-inch SAS HDD</b> 1 x 1.2TB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-408B
		<b>146.5GB 15K Hot Plug 2.5-inch SAS HDD</b> 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303B
		<b>300GB 15K Hot Plug 2.5-inch SAS HDD</b> 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331B
		<b>450GB 15K Hot Plug 2.5-inch SAS HDD</b> 1x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-442
		<b>600GB 15K Hot Plug 2.5-inch SAS HDD</b> 1x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-443
	SATA HDD	<b>250GB 7.2K Hot Plug 2.5-inch SATA HDD</b> 1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		<b>500GB 7.2K Hot Plug 2.5-inch SATA HDD</b> 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		<b>1TB 7.2K Hot Plug 2.5-inch SATA HDD</b> 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
	SAS SSD	<b>200GB Hot Plug 2.5-inch SAS SSD</b> 1 x 200 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-711
		<b>400GB Hot Plug 2.5-inch SAS SSD</b> 1 x 400 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-712

**NOTE:**

- All drives within a RAID array should be of the same type, capacity and rotation speed.
- Up to two different kinds of drives selected from SAS 10K HDDs, SAS 15K HDDs, SATA HDDs and SAS SSDs can be mixed in one system.
- To configure a large-capacity RAID array, it is recommended to configure in RAID 6 or RAID 60 in order to minimize the risk of becoming multiple hard drives failure during the RAID rebuilding process.



#### 4.2.10 Up to eight Drives with RAID 5/6 Controller with 1 GB Cache/CacheVault

Category	Product Name / Description		Part Number
<b>Storage Controller Required</b>	<b>RAID Controller (1GB, RAID 0/1/5/6)</b> LSI MegaRAID SAS 9270CV-8i (with CV) RAID0/1/5/6/10/50/60, 1GB Cache, Int. 8ports, PCIe 3.0(x8), 6Gb/s, flash cache protection modules included		N8103-168
<b>SSD Caching Recommended</b>	<b>MegaRAID CacheCade</b> for LSI MegaRAID SAS <b>NOTE:</b> - SSD used for cache is required - The SSD capacity which can be used as read cache is up to 512 GB.		N8103-156
<b>Cable</b>	<b>Internal SAS/SATA Cable</b> two set of 1 x mini-SAS to 4 x Single SATA		(Standard)
<b>Drive Cage</b>	<b>2.5-inch Hot Plug Drive Cage Kit</b> 6 x 2.5-inch hot plug hard drive bays		(Standard)
<b>Optional Drive Cage Required</b>	<b>2.5-inch Hot Plug Drive Cage Kit</b> 2 x 2.5-inch hot plug drive bays		N8154-45
<b>Drive 8 slots available</b>	<b>SAS HDD</b>	<b>300GB 10K Hot Plug 2.5-inch SAS HDD</b> 1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301B
		<b>450GB 10K Hot Plug 2.5-inch SAS HDD</b> 1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322B
		<b>600GB 10K Hot Plug 2.5-inch SAS HDD</b> 1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304B
		<b>900GB 10K Hot Plug 2.5-inch SAS HDD</b> 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332B
		<b>1.2TB 10K Hot Plug 2.5-inch SAS HDD</b> 1 x 1.2TB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-408B
		<b>146.5GB 15K Hot Plug 2.5-inch SAS HDD</b> 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303B
		<b>300GB 15K Hot Plug 2.5-inch SAS HDD</b> 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331B
		<b>450GB 15K Hot Plug 2.5-inch SAS HDD</b> 1x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-442
		<b>600GB 15K Hot Plug 2.5-inch SAS HDD</b> 1x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-443
	<b>SATA HDD</b>	<b>250GB 7.2K Hot Plug 2.5-inch SATA HDD</b> 1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		<b>500GB 7.2K Hot Plug 2.5-inch SATA HDD</b> 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		<b>1TB 7.2K Hot Plug 2.5-inch SATA HDD</b> 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
	<b>SAS SSD</b>	<b>200GB Hot Plug 2.5-inch SAS SSD</b> 1 x 200 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-711
		<b>400GB Hot Plug 2.5-inch SAS SSD</b> 1 x 400 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-712

**NOTE:**

- All drives within a RAID array should be of the same type, capacity and rotation speed.
- Up to two different kinds of drives selected from SAS 10K HDDs, SAS 15K HDDs, SATA HDDs and SAS SSDs can be mixed in one system.
- To configure a large-capacity RAID array, it is recommended to configure in RAID 6 or RAID 60 in order to minimize the risk of becoming multiple hard drives failure during the RAID rebuilding process.



## 4.3 Hot Plug 3.5-inch Drive Configuration

### 4.3.1 Up to four Drives with Embedded SATA non-RAID Controller

Category	Product Name / Description	Part Number
Storage Controller	<b>Embedded SATA Controller</b> 2 x 6Gb/s SATA, 2 x 3Gb/s SATA	(Standard)
Cable	<b>Internal SATA Cable</b> 4 x Single SATA to 1 x mini-SAS	(Standard)
Drive Cage	<b>3.5-inch Hot Plug Drive Cage Kit</b> 4 x 3.5-inch hot plug hard drive bays	(Standard)
Drive 4 slots available	<b>500GB 7.2K Hot Plug 3.5-inch SATA HDD</b> 1 x 500 GB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-363
	<b>1TB 7.2K Hot Plug 3.5-inch SATA HDD</b> 1 x 1 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-364
	<b>2TB 7.2K Hot Plug 3.5-inch SATA HDD</b> 1 x 2 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-354

**NOTE:**

- Hot plug insertion/removal is not supported with the configuration.

### 4.3.2 Up to four Drives with Embedded SATA RAID Controller

Category	Product Name / Description	Part Number
Storage Controller	<b>Embedded SATA Controller</b> 2x 6Gb/s SATA, 2x 3Gb/s SATA, RAID 0/1/10 capable	(Standard)
Cable	<b>Internal SATA Cable</b> 4 x Single SATA to 1 x mini-SAS	(Standard)
Drive Cage	<b>3.5-inch Hot Plug Drive Cage Kit</b> 4 x 3.5-inch hot plug hard drive bays	(Standard)
Drive 4 slots available	<b>500GB 7.2K Hot Plug 3.5-inch SATA HDD</b> 1 x 500 GB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-363
	<b>1TB 7.2K Hot Plug 3.5-inch SATA HDD</b> 1 x 1 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-364
	<b>2TB 7.2K Hot Plug 3.5-inch SATA HDD</b> 1 x 2 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-354
	<b>3TB 7.2K Hot Plug 3.5-inch SATA HDD</b> 1 x 3 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-355
	<b>4TB 7.2K Hot Plug 3.5-inch SATA HDD</b> 1 x 4 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-395

**NOTE:**

- Embedded SATA RAID controller is supported only on Windows operating systems. An optional RAID controller is required to configure RAID array for other operating systems.
- Embedded SATA RAID Controller does not support RAID 10 configured with 2TB, 3TB and 4TB HDDs.
- All hard drives within a RAID array should be of the same capacity.

### 4.3.3 Up to four Drives with RAID 0/1 Controller with 512 MB Cache

Category	Product Name / Description	Part Number
<b>Storage Controller</b> <b>Required</b>	<b>RAID Controller (512MB, RAID 0/1)</b> LSI MegaRAID SAS 9272-8i RAID 0/1/10, 512 MB, Int. 8, PCIe 3.0 x8, 6Gb/s	N8103-172
<b>RAID BBU</b> <b>Recommended</b>	RAID Battery Backup Unit for LSI MegaRAID SAS 9267-8i/9272-8i	N8103-153
<b>Cable</b>	<b>Internal SAS/SATA Cable</b> 4 x Single SATA to 1 x mini-SAS	(Standard)
<b>Drive Cage</b>	<b>3.5-inch Hot Plug Drive Cage Kit</b> 4 x 3.5-inch hot plug hard drive bays	(Standard)
<b>Drive</b> <b>4 slots available</b>	<b>500GB 7.2K Hot Plug 3.5-inch SATA HDD</b> 1 x 500 GB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-363
	<b>1TB 7.2K Hot Plug 3.5-inch SATA HDD</b> 1 x 1 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-364
	<b>2TB 7.2K Hot Plug 3.5-inch SATA HDD</b> 1 x 2 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-354
	<b>3TB 7.2K Hot Plug 3.5-inch SATA HDD</b> 1 x 3 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-355
	<b>4TB 7.2K Hot Plug 3.5-inch SATA HDD</b> 1 x 4 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-395

**NOTE:**

- All hard drives within a RAID array should be of the same capacity.

### 4.3.4 Up to four Drives with RAID 5/6 Controller with 512 MB Cache

Category	Product Name / Description	Part Number
<b>Storage Controller</b> <b>Required</b>	<b>RAID Controller (512MB, RAID 0/1/5/6)</b> LSI MegaRAID SAS 9272-8i RAID0/1/5/6/10/50/60, 512 MB, Int. 8, PCIe 3.0 x8, 6Gb/s	N8103-173
<b>RAID BBU</b> <b>Recommended</b>	RAID Battery Backup Unit for LSI MegaRAID SAS 9267-8i/9272-8i	N8103-153
<b>Cable</b>	<b>Internal SAS/SATA Cable</b> 4 x Single SATA to 1 x mini-SAS	(Standard)
<b>Drive Cage</b>	<b>3.5-inch Hot Plug Drive Cage Kit</b> 4 x 3.5-inch hot plug hard drive bays	(Standard)
<b>Drive</b> <b>4 slots available</b>	<b>500GB 7.2K Hot Plug 3.5-inch SATA HDD</b> 1 x 500 GB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-363
	<b>1TB 7.2K Hot Plug 3.5-inch SATA HDD</b> 1 x 1 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-364
	<b>2TB 7.2K Hot Plug 3.5-inch SATA HDD</b> 1 x 2 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-354
	<b>3TB 7.2K Hot Plug 3.5-inch SATA HDD</b> 1 x 3 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-355
	<b>4TB 7.2K Hot Plug 3.5-inch SATA HDD</b> 1 x 4 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-395

**NOTE:**

- All hard drives within a RAID array should be of the same capacity.

#### 4.3.5 Up to four Drives with RAID 5/6 Controller with 1 GB Cache/Battery

Category	Product Name / Description	Part Number
<b>Storage Controller</b> <b>Required</b>	<b>RAID Controller (1GB, RAID 0/1/5/6)</b> LSI MegaRAID SAS 9272-8i RAID 0/1/5/6/10/50/60, 1 GB, Int. 8, PCIe 3.0 x8, 6Gb/s	N8103-174
<b>RAID BBU</b> <b>Recommended</b>	RAID Battery Backup Unit for LSI MegaRAID SAS 9267-8i/9272-8i	N8103-153
<b>Cable</b>	<b>Internal SAS/SATA Cable</b> 4 x Single SATA to 1 x mini-SAS	(Standard)
<b>Drive Cage</b>	<b>3.5-inch Hot Plug Drive Cage Kit</b> 4 x 3.5-inch hot plug hard drive bays	(Standard)
<b>Drive</b> <b>4 slots available</b>	<b>500GB 7.2K Hot Plug 3.5-inch SATA HDD</b> 1 x 500 GB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-363
	<b>1TB 7.2K Hot Plug 3.5-inch SATA HDD</b> 1 x 1 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-364
	<b>2TB 7.2K Hot Plug 3.5-inch SATA HDD</b> 1 x 2 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-354
	<b>3TB 7.2K Hot Plug 3.5-inch SATA HDD</b> 1 x 3 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-355
	<b>4TB 7.2K Hot Plug 3.5-inch SATA HDD</b> 1 x 4 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-395

**NOTE:**

- All hard drives within a RAID array should be of the same capacity.

#### 4.3.6 Up to four Drives with RAID 5/6 Controller with 1 GB Cache/CacheVault

Category	Product Name / Description	Part Number
<b>Storage Controller</b> <b>Required</b>	<b>RAID Controller (1GB, RAID 0/1/5/6)</b> LSI MegaRAID SAS 9270CV-8i (with CV) RAID0/1/5/6/10/50/60, 1GB Cache, Int. 8ports, PCIe 3.0(x8), 6Gb/s, flash cache protection modules included	N8103-168
<b>RAID BBU</b> <b>Recommended</b>	RAID Battery Backup Unit for LSI MegaRAID SAS 9267-8i/9272-8i	N8103-153
<b>Cable</b>	<b>Internal SAS/SATA Cable</b> 4 x Single SATA to 1 x mini-SAS	(Standard)
<b>Drive Cage</b>	<b>3.5-inch Hot Plug Drive Cage Kit</b> 4 x 3.5-inch hot plug hard drive bays	(Standard)
<b>Drive</b> <b>4 slots available</b>	<b>500GB 7.2K Hot Plug 3.5-inch SATA HDD</b> 1 x 500 GB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-363
	<b>1TB 7.2K Hot Plug 3.5-inch SATA HDD</b> 1 x 1 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-364
	<b>2TB 7.2K Hot Plug 3.5-inch SATA HDD</b> 1 x 2 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-354
	<b>3TB 7.2K Hot Plug 3.5-inch SATA HDD</b> 1 x 3 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-355
	<b>4TB 7.2K Hot Plug 3.5-inch SATA HDD</b> 1 x 4 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-395

**NOTE:**

- All hard drives within a RAID array should be of the same capacity.

## 5 Optical Drive

Category	Product Name / Description	Part Number
<b>Internal</b> 1 slot available	<b>Internal Slim DVD-ROM drive</b> Slim DVD-ROM drive	N8151-122
	<b>Internal DVD Super Multi Drive</b> Slim DVD Super Multi drive, not including writing software	N8151-107F
<b>External</b>	<b>External DVD-ROM drive</b> DVD-ROM drive, Bus powered, 1.2 A required	N8160-91

### NOTE:

- Up to 1 optical drive can be connected.
- N8154-45 2.5-inch Hot Plug Drive Cage Kit cannot be installed when an internal optical drive is installed.

## 6 PCI Riser Card / PCI Card

Please refer to [Supported PCI Cards and Installable Slots](#) with regard to the position of PCI slot which can mount PCI card supported.

### 6.1 Network Interface Controller

Category	Product Name / Description	Part Number
<b>Adapter</b> <b>1GbE</b>	<b>1000BASE-T Adapter</b> Broadcom ® BCM5718 Gigabit Ethernet Controller PCIe 2.0 x1	N8104-138
	<b>Dual Port 1000BASE-T Adapter</b> Broadcom ® BCM5718 Gigabit Ethernet Controller PCIe 2.0 x1	N8104-132
	<b>Dual Port 1000BASE-T Adapter</b> Intel® 82580 Gigabit Ethernet Controller PCIe 2.0 x4	N8104-145
	<b>Quad Port 1000BASE-T Adapter</b> Broadcom ® BCM5719 Gigabit Ethernet Controller PCIe 2.0 x4	N8104-133
<b>NOTE:</b> - Network cables with RJ-45 plug covers cannot be used.		
<b>10GbE</b>	<b>10GBASE Adapter (SFP+/2ch)</b> Broadcom NetXtreme II BCM957711 10G SFP+ Dual Port Network Interface Card PCIe 2.0 x8	N8104-128
	<b>NOTE:</b> - N8104-129 SFP+ Module is required to connect with an optical cable. - Up to 2 SFP+ Modules can be installed. - Supports up to 2 adapters covering 10Gb Converged Network Adapter and 10Gb Network Adapter.	
	<b>Dual Port 10GBASE-T Adapter</b> Intel X540 PCIe 2.0(x8)	N8104-153
	<b>Dual Port 10Gb Converged Network Adapter</b> BROCADE 1020 Dual Port 10Gbps Converged Network Adapter PCIe 2.0 x8, 2 x SFP modules, Max. one adapter	N8104-131
<b>NOTE:</b> - Supports up to 2 adapters covering 10Gb Converged Network Adapter and 10Gb Network Adapter.		
<b>SFP+ Module</b>	<b>SFP+ Module (10G-SR)</b> 1 x SFP+ Module for N8104-128	N8104-129

## NIC Teaming feature – NIC Teaming and bonding features

See the table below for supported network interfaces and OS combinations.

Windows Server 2008 support BASP (Broadcom Advanced Server Program) or Intel PROSet teaming while Windows Server 2012, Windows Server 2012 R2 and Linux support teaming with bonding function supported by OS.

Network Interface	Team	Operating Systems
<b>1GbE NIC</b> Embedded 1GbE NIC and N8104-138/-132/-133	Up to four teams per one system Up to four ports per one team	Windows Server 2008 Windows Server 2008 R2 Windows Server 2012 Windows Server 2012 R2 Red Hat Enterprise Linux
<b>1GbE NIC</b> N8104-145	Up to four teams per one system Up to four ports per one team	Windows Server 2008 Windows Server 2008 R2 Windows Server 2012
<b>10GbE NIC</b> N8104-128	Up to two teams per one system Up to two ports per one team	Windows Server 2008 Windows Server 2008 R2 Windows Server 2012 Windows Server 2012 R2 Red Hat Enterprise Linux

### NOTE:

- NIC Teaming feature is not supported on iSCSI interfaces.
- The network interfaces for NIC teaming must be the same.
- When 10GbE and 1GbE NIC teaming are mixed, the teams must be up to four per one system.

## Using iSCSI

See the table below for supported network interfaces and OS combinations.

Category	Network Interface	Operating Systems
<b>1GbE</b>	Embedded 1GbE NIC	Windows Server 2008 R2, Windows Server 2012, Windows Server 2012 R2, Red Hat Linux, VMware
	N8104-138	Windows Server 2008 R2, Windows Server 2012, Windows Server 2012 R2, Red Hat Linux, VMware
	N8104-132	Windows Server 2008 R2, Windows Server 2012, Windows Server 2012 R2, Red Hat Linux, VMware
	N8104-133	Windows Server 2008 R2, Windows Server 2012, Windows Server 2012 R2, Red Hat Linux, VMware
<b>10GbE</b>	N8104-128	Windows Server 2008, Windows Server 2008 R2, Windows Server 2012, Windows Server 2012 R2, Red Hat Linux, VMware

### NOTE:

- NIC Teaming feature is not supported on iSCSI interfaces.

## 6.2 InfiniBand

Category	Product Name / Description		Part Number
Controller	<b>Single Port InfiniBand Adapter</b> Mellanox ConnectX-3 VPI, MCX353A-FCBT, FDR, PCIe 3.0(x8) <b>NOTE:</b> - For using this product in Windows Server 2012 R2 environment, download the driver from the NEC website.		N8104-146
	<b>Dual Port InfiniBand Adapter</b> Mellanox ConnectX-3 VPI, MCX354A-FCBT, FDR, PCIe 3.0(x8) <b>NOTE:</b> - For using this product in Windows Server 2012 R2 environment, download the driver from the NEC website.		N8104-147
Cable	<b>InfiniBand Cable 2m/FDR</b> Copper		K410-304(02)
	<b>InfiniBand Cable 3m/FDR</b> Copper		K410-304(03)
Switch	Unit	<b>InfiniBand Switch 36 ports/FDR</b> Mellanox MSX6036F-1SFR 36 ports, FDR, One power supply module included, no power cord	NE3707-061
	Power Supply	<b>Redundant Power Supply Unit</b> Power supply module for 36 ports InfiniBand switch, no power cord	NE3707-063

**NOTE:**

- The InfiniBand adapters and other options are make-to-order products. Please consult our sales representative in regards to production lead time.

## 6.3 External Storage Controller

### 6.3.1 RAID Controller

Category	Product Name / Description	Part Number
Controller	<b>RAID Controller (1GB, RAID0/1/5/6)</b> LSI MegaRAID SAS 9285CV-8e RAID0/1/5/6/10/50/60, 1GB, Ext. 8, PCIe 3.0 x8, SAS 6Gb/s, SATA 6Gb/s, flash cache protection modules included	N8103-161

**NOTE:**

- To configure a large-capacity RAID array, it is recommended to configure in RAID 6 or RAID 60 in order to minimize the risk of becoming multiple hard drives failure during the RAID rebuilding process.
- It is recommended to set RAID array configuration drives less than eight to minimize the risk of becoming multiple hard drives failure.

### 6.3.2 Fibre Channel / SAS Controller

Category	Product Name / Description	Part Number
Fibre Channel	<b>Fibre Channel Controller (1ch)</b> Emulex LightPulse LPe1250-F8 Host Bus Adapter 8Gb/s, Optical, PCIe 2.0 x8	N8190-153
	<b>Fibre Channel Controller (2ch)</b> Emulex LightPulse LPe12002-M8 Host Bus Adapter 8Gb/s, Optical, PCIe 2.0 x8	N8190-154
	<b>Fibre Channel Controller (1ch)</b> Emulex LightPulse LPe16000B-M6 Host Bus Adapter 16Gb/s, Optical, PCIe 3.0 x8	N8190-157
	<b>Fibre Channel Controller (2ch)</b> Emulex LightPulse LPe16002B-M6 Host Bus Adapter 16Gb/s, Optical, PCIe 3.0 x8 <b>NOTE:</b> - Not supported in a single processor configuration with Xeon E5-2403 v2/-2407 v2	N8190-158
SAS	<b>SAS Controller</b> LSI SAS9212-4i4e Host Bus Adapter 6Gb/s SAS, Int. 4(7-pin SATA) / ext. 4(SFF-8088), PCIe 2.0(x8), Low Profile / Full Height <b>NOTE:</b> - For using this product in Windows Server 2012 R2 environment, download the driver from the NEC website.	N8103-142

## 6.4 Serial Port Adapter

Product Name / Description	Part Number
<b>Serial Port Adapter</b> Serial port fixed to PCI bracket	N8117-01A

**NOTE:**

- Up to one Serial Port Adapter can be installed.

## 7 Other Add-in Components

### 7.1 Power Supply

Product Name / Description	Part Number
<b>450W Hot Plug Power Supply</b> 1 x 450 Watt 80 PLUS® Platinum	N8181-86F
<b>800W Hot Plug Power Supply</b> 1 x 800 Watt 80 PLUS® Platinum	N8181-87F
<b>800W Hot Plug Power Supply</b> 1 x 800 Watt 80 PLUS® Titanium <b>NOTE:</b> 200 VAC input only supported	N8181-118F

**NOTE:**

- The power units must be the same to configure redundancy.
- Use the NEC Power Supply Selector to select appropriate size for power units. For details, please visit the NEC website at:  
[http://www.nec.com/en/global/prod/express/collateral/tools/PowerSelector\\_G01.xls](http://www.nec.com/en/global/prod/express/collateral/tools/PowerSelector_G01.xls)



## 7.2 Trusted Platform Module Kit

Product Name / Description	Part Number
<b>Trusted Platform Module Kit</b> TPM 1.2 module	N8115-20

### NOTE:

- The kit is not available in China.
- The kit is not removable after attachment.
- "TPM Support" in BIOS setup menu must be activated prior to use of this product.
- To use Windows BitLocker drive encryption, be sure to keep the "recovery password" of BitLocker function. The recovery password is required to restore data for hardware replacement during a system error.

## 7.3 Internal Flash Memory

Product Name / Description	Part Number
<b>Internal Flash Memory</b> Internal flash memory to enable software and tools in the EXPRESSBUILDER DVD without DVD media	N8115-10

### NOTE:

- Before use, software and tools must be copied from the EXPRESSBUILDER DVD to the flash memory.
- The following operations can be performed with the flash memory:
  - Installation of Windows server with express setup
  - Installation of Starter Pack—the package of NEC qualified drivers and system setting tools
  - Installation of NEC ESM PRO Agent and Universal RAID Utility
  - Performance of the Test and Diagnosis Tool

## 7.4 Flash FDD

Choose the Flash FDD if you need to prepare an alternative device for a floppy drive.

Product Name / Description	Part Number
<b>Flash FDD</b> USB flash emulating USB floppy disk, Native capacity 1.44 MB	N8160-86

### NOTE:

- Up to one drive can be connected.

## 7.5 Front Bezel

Product Name / Description	Part Number
<b>Front Bezel</b> Front bezel for R120e-1E	N8146-50F

## 8 Add-on Components

### 8.1 17-inch LCD Console Drawer

Category		Product Name / Description	Part Number
<b>Drawer w/ KVM</b>	<b>Drawer</b>	<b>17-inch LCD Console Drawer (8port)</b> 17-inch LCD, US 83-keys Keyboard, Optical mouse, 8 port KVM switch, 1U height	N8143-77F
	<b>Cable</b>	<b>Switch Unit Connection Cable Set (USB, 1.8m)</b> 1.8 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 1 x 4-pin USB A	K410-118(1A)
		<b>Switch Unit Connection Cable Set (USB, 3m)</b> 3 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 1 x 4-pin USB A	K410-118(03)
		<b>Switch Unit Connection Cable Set (USB, 5m)</b> 5 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 1 x 4-pin USB A	K410-118(05)
<b>Drawer w/o KVM</b>	<b>Drawer</b>	<b>17inch LCD Console Unit 1U</b> 17-inch LCD, US 83-keys Keyboard, Optical mouse, 1U height, 4-pin USB B to 4-pin USB A cable 2 m, PS/2 Y-splitter cable 2m, 15-pin mini D-sub VGA cable 2 m	N8143-76F
		<b>17inch LCD Console Drawer (1port)</b> 17-inch LCD, US 103-keys Keyboard with 10-key, Touch pad with 3-button, 1U height, 4-pin USB B to 4-pin USB A cable 1.8 m, Two PS/2 cable 1.8 m, 15-pin mini D-sub VGA cable 1.8 m	N8143-84F
	<b>Keypad</b>	<b>Keyboard Unit (JP)</b> JP 108-keys Keyboard with 10-key for N8143-84F 17inch LCD Console Drawer (1port)	N8143-85
		<b>Keyboard Unit (UK)</b> UK 104-keys Keyboard with 10-key, for N8143-84F 17inch LCD Console Drawer (1port)	N8143-87

**NOTE:**

- There are two VGA connectors on R120e-1E, one on the front side and one on the rear side. However, the front side only works when both are connected at the same time.

### 8.2 KVM Switch

Category		Product Name / Description	Part Number
<b>KVM Switch</b>		<b>Server Switch Unit (8 server)</b> 1U USB 8 port KVM switch	N8191-12F
<b>Cable</b>	<b>KVM</b>	<b>Switch Unit Connection Cable Set (USB,1.8m)</b> 1.8 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 1 x 4-pin USB A	K410-118(1A)
		<b>Switch Unit Connection Cable Set (USB,3m)</b> 3 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 1 x 4-pin USB A	K410-118(03)
		<b>Switch Unit Connection Cable Set (USB,3m)</b> 5 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 1 x 4-pin USB A	K410-118(05)
	<b>Cascading</b>	<b>Switch Unit Connection Cable 1.8 m</b> 1.8 m, 1 x 15-pin mini D-sub - 1x 15-pin mini D-Sub / 2x PS/2	K410-119(1A)

**NOTE:**

- There are two VGA connectors on R120e-1E, one on the front side and one on the rear side. However, the front side only works when both are connected at the same time.

### 8.3 Cable Management Arm

Product Name / Description	Part Number
<b>Cable Management Arm 1U Kit</b> for R120e-1E	N8143-96

### 8.4 Server Management License

The server integrates the EXPRESSSCOPE Engine 3 as standard. Refer to [Server Management](#) for the standard management features. For more extensive remote KVM and remote media features, choose the following kit.

Product Name / Description	Part Number
<b>Remote KVM and Media License Kit</b> License for one server. Remote KVM and remote media are enabled regardless of OS status. Remote KVM: <ul style="list-style-type: none"> <li>- Displays a graphics console on the web browser of the remote terminal (PC/server).</li> <li>- Controls keyboard and mouse via the remote terminals' web browser</li> </ul> Remote media: Enables the user to use the CD / DVD / FD / Flash memory of the remote terminals (PC/server) as if accessing the local drives.	N8115-04

**NOTE:** Remote KVM and remote media features are not available for virtual machines.

# References

## Server Management

The EXPRESSSCOPE Engine 3, integrated into the server, provides superior remote control and system management features listed in the table below.

		Standard	With Remote KVM and Media License kit
<b>Hardware monitoring</b>	Temperature/voltage/power/standard LAN fan /degeneration (memory/hard drive)	✓	✓
	Hardware configuration information collection	✓	✓
	Hardware event log collection	✓	✓
<b>Boot monitoring</b>	BIOS/POST stall, Booting, OS stall, shutdown	✓ <sup>1</sup>	✓ <sup>1</sup>
<b>Alerting</b>	HW error, Boot error , and OS panic (by SNMP, E-Mail)	✓	✓
<b>Remote KVM (via LAN)</b>	POST/BIOS setup, ROM utility	✓ <sup>2</sup>	✓
	Panic screen, Boot screen	✓ <sup>2, 3, 4</sup>	✓
	CUI-based screen (OS console)	✓ <sup>2, 4</sup>	✓
	GUI-based screen (OS console)	-	✓
	Remote console recording function	-	✓
<b>Remote control (via LAN)</b>	Remote reset/power on-off/ dump	✓	✓
	Remote power capping	✓	✓
	BIOS/BMC FW update	✓	✓
	Remote BIOS setup(partial configuration only)	✓	✓
	OS shutdown	✓ <sup>1</sup>	✓ <sup>1</sup>
	Remote media (CD/DVD/FD/USB)	-	✓
	CLP (Command Line Protocol) (DMTF compliant)	✓	✓
	Remote control via Web browser (multi user login at the same time)	✓	✓
	Scheduling (without UPS)	✓ <sup>1</sup>	✓ <sup>1</sup>
<b>Maintenance</b>	EXPRESSSCOPE® Profile key (Backup/restore BIOS/BMC setup information)	✓	✓
<b>Others</b>	Set automatic IP address via DNS/DHCP	✓	✓
	LDAP/Active Directory verification/user control	✓	✓
	Clock synchronization of main unit and the RTC	✓	✓
	Access log collection	✓	✓
<b>Industry standard</b>	IPMI	2.0	2.0

<sup>1</sup> The feature is not supported on VMware ESXi systems.

<sup>2</sup> The optional serial port is not available for the feature.

<sup>3</sup> Monitoring boot screens is not supported on VMware systems.

<sup>4</sup> In VMware systems, only the direct console user interface is supported.

## OS Support Matrix for PCI Cards

Part number	Product Name	WS 2012 R2	WS 2012	WS 2008R2	WS 2008	WS 2008 x64	RHEL 6	RHEL 6 x64	RHEL 5	RHEL 5 x64	ESXi 5.5	ESXi 5.1	ESXi 5.0
-	Embedded SATA non-RAID Controller	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
-	Embedded SATA RAID Controller	-	-	✓	✓	✓	-	-	-	-	-	-	-
-	Embedded 1GbE NIC	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8103-172	RAID Controller (512 MB, RAID 0/1)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8103-173	RAID Controller (512 MB, RAID 0/1/5/6)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8103-174	RAID Controller (1 GB,RAID 0/1/5/6)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8103-168	RAID Controller (1 GB,RAID 0/1/5/6)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8103-161	RAID Controller (1 GB,RAID 0/1/5/6)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8103-142	SAS Controller	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	✓
N8190-153	Fibre Channel Controller	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8190-154	Fibre Channel Controller (2ch)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8190-157	Fibre Channel Controller	✓	✓	✓	-	-	-	✓	-	-	✓	-	-
N8190-158	Fibre Channel Controller (2ch)	✓	✓	✓	-	-	-	✓	-	-	✓	-	-
N8104-138	1000BASE-T adapter	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8104-132	Dual Port 1000BASE-T Adapter	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8104-133	Quad Port 1000BASE-T Adapter	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8104-145	Dual Port 1000BASE-T Adapter	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8104-128	10GBASE adapter (SFP+/2ch)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8104-153	Dual Port 10GBASE-T Adapter	-	-	-	-	-	-	✓	-	-	-	-	-
N8104-131	Dual Port 10Gb Converged Network Adapter	-	-	✓	✓	✓	✓	✓	✓	✓	-	-	-
N8104-146	Single Port InfiniBand Adapter	✓	✓	-	-	-	-	✓	-	-	-	-	-
N8104-147	Dual Port InfiniBand Adapter	✓	✓	-	-	-	-	✓	-	-	-	-	-

## Supported PCI Cards and Installable Slots

Part Number	Product Name	Slots		
		#1A	#1B	#1C
N8103-172	RAID Controller (512 MB, RAID 0/1)	✓	-	-
N8103-173	RAID Controller (512 MB, RAID 0/1/5/6)	✓	-	-
N8103-174	RAID Controller (1 GB,RAID 0/1/5/6)	✓	-	-
N8103-168	RAID Controller (1 GB,RAID 0/1/5/6)	✓	-	-
N8103-161	RAID Controller (1 GB,RAID 0/1/5/6)	-	✓	✓
N8103-142	SAS Controller	-	✓	✓
N8190-153	Fibre Channel Controller	-	✓	✓
N8190-154	Fibre Channel Controller (2ch)	-	✓	✓
N8190-157	Fibre Channel Controller		✓	✓
N8190-158	Fibre Channel Controller (2ch)		✓	-
N8104-138	1000BASE-T adapter	-	✓	✓
N8104-132	Dual Port 1000BASE-T Adapter	-	✓	✓
N8104-133	Quad Port 1000BASE-T Adapter	-	✓	✓
N8104-145	Dual Port 1000BASE-T Adapter	-	✓	✓
N8104-128	10GBASE adapter (SFP+/2ch)	-	✓	✓
N8104-153	Dual Port 10GBASE-T Adapter	-	✓	✓
N8104-131	Dual Port 10Gb Converged Network Adapter	-	✓	✓
N8104-146	Single Port InfiniBand Adapter	-	✓	-
N8104-147	Dual Port InfiniBand Adapter	-	✓	-
N8117-01A	Serial Port Adapter	-	✓	✓

## Maximum power consumption

See the table below for the maximum power consumption based on type of power supplies installed. The power consumption was measured in 40 degree Celsius (104 degree Fahrenheit) environment.

### 2.5-inch Drive Model

Processors		E5-2403 v2	E5-2407 v2	E5-2420 v2	E5-2430 v2	E5-2430L v2	E5-2440 v2	E5-2470 v2
200 VAC input	800 Watt PSU	357 VA / 354 Watt	364 VA / 361 Watt	430 VA / 427 Watt	457 VA / 454 Watt	414 VA / 411 Watt	483 VA / 479 Watt	530 VA / 526 Watt
	450 Watt PSU	332 VA / 330 Watt	339 VA / 337 Watt	406 VA / 403 Watt	432 VA / 429 Watt	390 VA / 387 Watt	438 VA / 435 Watt	485 VA / 482 Watt
100 VAC input	800 Watt PSU	361 VA / 358 Watt	367 VA / 365 Watt	435 VA / 432 Watt	462 VA / 458 Watt	418 VA / 415 Watt	487 VA / 484 Watt	535 VA / 531 Watt
	450 Watt PSU	336 VA / 333 Watt	342 VA / 340 Watt	410 VA / 407 Watt	437 VA / 434 Watt	393 VA / 391 Watt	442 VA / 439 Watt	490 VA / 486 Watt

### 3.5-inch drive model

Processors		E5-2403 v2	E5-2407 v2	E5-2430 v2	E5-2430L v2	E5-2440 v2
200 VAC input	450 Watt PSU	311 VA / 309 Watt	318 VA / 315 Watt	411 VA / 408 Watt	383 VA / 380 Watt	449 VA / 446 Watt
100 VAC input	450 Watt PSU	314 VA / 312 Watt	321 VA / 319 Watt	415 VA / 412 Watt	387 VA / 384 Watt	453 VA / 450 Watt

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For hard drive capacity measurements, 1 GB = 1 billion bytes. Actual formatted capacity is less.



## Revision History

Revision	Date	Description
2.0	July 18, 2014	<p><b>New products added:</b>            450GB 15K Hot Plug 2.5-inch SAS HDD / N8150-442            600GB 15K Hot Plug 2.5-inch SAS HDD / N8150-443            Dual Port 10GBASE-T Adapter / N8104-153</p> <p><b>Part number changed:</b>            300GB 10K Hot Plug 2.5-inch SAS HDD / N8150-301B            450GB 10K Hot Plug 2.5-inch SAS HDD / N8150-322B            600GB 10K Hot Plug 2.5-inch SAS HDD / N8150-304B            900GB 10K Hot Plug 2.5-inch SAS HDD / N8150-332B            1.2TB 10K Hot Plug 2.5-inch SAS HDD / N8150-408B            146.5GB 15K Hot Plug 2.5-inch SAS HDD / N8150-303B            300GB 15K Hot Plug 2.5-inch SAS HDD / N8150-331B</p> <p><b>Others:</b>            Added configuration limitations for N8190-158            Added the minimum required memory capacity for ESXi5.5 (5GB)            Added a note for processors            WS2012 R2 is added in the supported OS for iSCSI            Added a note for InfiniBand Adapter            WS2012 R2 is supported with N8103-142 SAS Controller            Added a note for VGA connectors</p>
1.0	January 16, 2014	Initial release